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Attachment H

Proposal # **2001-** K201 (Office Use Only)

PSP Cover Sheet (Attach to the front of each proposal)

Proposal Title: Genetic Population Structure of Central Valley Chinook Salmon
Applicant Name: California Department of Fish and Game
Contact Name: Deborah C. Mckee (CDFG)
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Amount of funding requested: $1,321,585

Some entities charge different costs dependent on the source of the funds. If it is different for state or federal funds list below.

State cost $1,321,585 Federal cost $1,337,863

Cost share partners? **X Yes ___No**

Identify partners and amount contributed by each: California Department of Fish and Game $316,940 and National Marine Fisheries Service $312,454

Indicate the Topic for which you are applying (check only one box).

- ☐ Natural Flow Regimes
- ☐ Nonnative Invasive Species
- ☐ Channel Dynamics/ Sediment Transport
- ☐ Flood Management
- ☐ Shallow Water Tidal/ Marsh Habitat
- ☐ Contaminants
- ☐ Beyond the Riparian Corridor
- ☐ Local Watershed Stewardship
- ☐ Environmental Education
- ☐ Special Status Species Survey s and Studies
- X Fishery Monitoring, Assessment and Research
- ☐ Fish Screens

What county or counties is the project located in? Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Fresno, Glenn, Madera, Mariposa, Merced, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Stanislaus, Sutter, Tehama, Tuolumne, Yuba

What CALFED ecozone is the project located in? See attached list and indicate number. Be as specific as possible: 3.1, 4.1, 4.4, 5.1, 5.2, 7.2, 7.3, 7.4, 7.5, 7.6, 8.1, 8.2, 9.2,11.1, 11.2.

Indicate the type of applicant (check only one box):

- X State agency
- ☐ Public/Non-profit joint venture
- ☐ Local government /district
- ☐ University
- ☐ Other: _____
- ☐ Federal agency
- ☐ Non-profit
- ☐ Tribes
- ☐ Private part y

Indicate the primary species which the proposal addresses (check all that apply):

- ☐ San Joaquin and East-side Delta tributaries

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- ☐ Winter-run chinook salmon
- ☐ Late-fall run chinook salmon
- ☐ Delta smelt
- ☐ Splittail
- ☐ Green sturgeon
- ☐ White Sturgeon _
- ☐ Waterfowl and Shorebirds
- ☐ Migratory birds
- ☐ Other listed T/E species:_____
- ☐ Spring-run chinook salmon
- ☐ Fall-run chinook salmon
- ☐ Longfin smelt
- ☐ Steelhead t rout
- ☐ Striped bass
- X All chinook species
- ☐ All anadromous salmonids
- ☐ American shad

Indicate the type of project (check only one box):

- X Research/Monitoring
- ☐ Pilot /Demo Project
- ☐ Full-scale Implementation
- ☐ Watershed Planning
- ☐ Education

Is this a next-phase of an ongoing project? Yes ____ No X

Have you received funding from C ALFED before? Yes ____ No X

I f yes, list project title and CALFED number _____

Have you received funding from CVPIA before? Yes ____ No X

I f yes, list CVPI A program providing funding, project title and CVPI A number (if applicable):

By signing below, the applicant declares the following:

- The truthfulness of all representations in their proposal;
- The individual signing the form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or organization); and
- The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section 2.4) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

Deborah C Mckee

Printed name of applicant

Deborah C. Mckee

Signature of applicant

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Executive Summary

Title: Genetic Population Structure of Central Valley Chinook Salmon

Amount Requested: $1,321,585
Applicant: Deborah C. McKee
California Department of Fish and Game
Native Anadromous Fish and Watershed Branch
1416 Ninth Street
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Telephone: 916.653.8983
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Collaborators: Mr. David Teel (NMFS), Dr. John Carlos Garza (NMFS), Dr. Gary Winans (NMFS), Dr. Jim Myers (NMFS), Mr. Bill Snider (CDFG), Dr. Robert Titus (CDFG)

The proposed project is a cooperative research effort by the California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS) that will provide a comprehensive assessment of genetic population structure to help guide recovery and restoration efforts for Central Valley chinook salmon. Recovery strategies depend upon the assessment of individual populations within the species and Evolutionarily Significant Units (ESUs), but baseline genetic data to define population boundaries and monitor the effects of restoration actions on population structure and dynamics is lacking.

The primary objective of the proposed study is to provide a comprehensive model of population structure for Central Valley chinook salmon populations, particularly in tributaries that support multiple temporal runs, that is consistent with observed patterns of genetic variation and integrates information on life history. Samples will be collected from freshly spawned carcasses from populations within all CALFED Ecological Management Zones. A basin-wide, standardized database of allozyme and microsatellite DNA data will be generated and all previously collected data will be integrated into it. The database will then be used to test the hypotheses that (i) population structure of Central Valley chinook salmon is best represented by a complex model with populations that represent both old lineages and some that have recently diverged and (ii) that some populations of Central Valley chinook salmon in the same river with different adult run timing are completely reproductively isolated and represent old genetic lineages, while some are not and represent populations which have recently diverged.

The specific population parameters that will be estimated with the genetic data are (i) population boundaries and times of divergence among populations, (ii) levels of gene flow, (iii) effective population sizes and determination of recent changes in population size (increases or decreases), and (iv) straying rates and levels of hybridization with hatchery-raised fish.

The final outcome will be an integrated ecosystem-level model of chinook population structure. that can then applied by the Central Valley Multi Species Conservation Strategy (MSCS) Planning Team in recovery and restoration efforts and an improved baseline genetic database for genetic stock identification (GSI) applications with Central Valley chinook salmon. The GSI baseline is used by NMFS and state fisheries laboratories to estimate contributions of various chinook salmon stocks to ocean fisheries and a more powerful and accurate set of methods can lead to decisions that will help to properly manage a significant source of mortality for these at-risk populations.

All Central Valley chinook salmon populations are identified as "At-Risk" by CALFED. The proposed study will address CALFED Ecosystem Recovery Plan Goal 1 "At-Risk Species" by helping to achieve recovery of chinook salmon through establishment of large, self-sustaining populations. Specifically, the proposed research will address the stated goals of providing a genetic assessment of Central Valley salmonids and improving and expanding the inventory and assessment of fishery resources. The proposed research will also help to achieve Strategic Goal 3 – Harvestable Species, because Central Valley chinook salmon are a harvested species.

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Project Description

1. Statement of the Problem

a. Problem. The proposed study will provide a comprehensive assessment of genetic population structure to help guide recovery and restoration efforts for Central Valley winter-, spring- fall- and late fall-run chinook salmon. All populations are identified as "First Priority Species" for recovery by CALFED.

The National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG) recently developed the Species Narrative Recovery Prescriptions/Goals for Central Valley spring-run and fall-/late fall-run chinook salmon Evolutionarily Significant Units (ESUs), which will be incorporated in CALFED's Multi Species Conservation Strategy (MSCS). These recovery policies are predicated on restoration of viable populations of naturally-spawning chinook salmon throughout a significant portion of their range and explicitly recognize the need to undertake conservation actions at population scales smaller than the ESU. An important component of this strategy is the Viable Salmonid Populations (VSP) framework developed by NMFS scientists (McElhany et al. 1999). The VSP approach is designed to facilitate establishment of ESU-level delisting goals by assessing key parameters for viability (e.g. abundance, productivity, spatial structure, diversity) of individual populations, then relating them to the viability of the ESU as a whole. Applying VSP concepts to recovery goals involves two major steps: assessing VSP characteristics at the population level, and integrating this information up to the ESU level. Before the VSP approach can be applied to Central Valley chinook salmon, demographically independent populations must be identified. Once independent populations within the ESU have been identified, the extinction risk of each can be estimated, and, ultimately, various combinations of individual populations that produce a viable (i.e. recovered) ESU can be determined. However, much of the empirical genetic data needed to describe population structure and identify demographically independent populations within Central Valley chinook salmon ESUs is lacking (Table 1).

Of particular importance, is information on population structure and genetic diversity in drainages that have multiple temporal runs. More than one temporal run of chinook salmon has been observed in several Sacramento River tributaries, including Antelope, Battle, Deer, Mill, Big Chico, and Butte creeks and the Feather and Yuba Rivers (Yoshiyama et al. 1996, 2000), yet the genetic relationships between runs within these rivers have not been determined. Concerns regarding potential genetic interactions among temporal runs are increasingly a focus in recovery planning for chinook salmon in Central Valley streams. For some localities, notably the Feather and Yuba rivers, possible hybridization, due to lack of spatial separation of spawning habitat or straying of hatchery fish, has been identified as an important risk factor (CDFG 1998; Myers et al.1998). The design of programs to establish self-sustaining populations of chinook salmon in these rivers and to assess the impact of management strategies such as alternative flow regimes, dam removal, modifications to hatchery practices and harvest regulations often hinges on assumptions about the genetic relationships among different temporal runs of fish within a river.

Previous genetic studies of chinook salmon provide a baseline with which to understand genetic population structure in the Central Valley ecosystem. These studies have employed several molecular genetic techniques, including allozymes (Bartley et al. 1992; Myers et al. 1998; Schiewe 1999), mitochondrial DNA (mtDNA) (Nielsen 1995), microsatellite DNA (Hedgecock et al. 1995; Nielsen et al. 1999; Banks et al. 2000), and a major histocompatibility complex gene (Kim et al. 1999). The results of these studies have provided some insight into the genetic structure of chinook populations. Among these are (i) Central Valley chinook salmon are well differentiated from coastal chinook salmon populations, (ii) genetic differentiation between populations in the same river with different run-times has apparently occurred independently in these areas (e.g. spring-run fish in the Central Valley are not closely related to spring-run fish in the Klamath River basin), (iii) within the Central Valley, major genetic units are mostly congruent with adult run-time, and (iv) most spawning populations in different drainages with similar run-times are also genetically similar. A synthesis of these aspects of genetic population structure with other biological and ecological information was used by NMFS to define chinook salmon ESUs for California

and the Central Valley (Myers et al. 1998). These studies also provide some insight into the genetic diversity that exists within drainages. Banks et al. (2000) detected no evidence for natural hybridization among temporal runs in Butte Creek and the mainstem Sacramento. Nielsen et al. (1999) noted that only 6.6% of observed genetic variation was attributable to spawning-run classifications.

However, these previous genetic studies have considerable limitations. Most important is the limited scope of sampling of the individual studies. For example, these studies generally examined different subsets of tributaries, did not examine samples from more than one naturally spawning in the same tributary and, with the notable exception of the allozyme studies, did not employ a sufficient number of loci. Moreover, many of these studies (primarily the microsatellite-based ones) suffer from a lack of standardization by employing different sets of markers, methods of analysis and sample sizes and representing populations by samples collected from different tributaries or by samples collected from the same tributaries but at different times of year. All of these factors render the results from the different studies not strictly compatible and can lead to conflicting pictures of genetic population structure.

The primary objective of the proposed study is to provide a comprehensive model of population structure for Central Valley chinook salmon populations, particularly in tributaries that support multiple temporal runs, that is consistent with observed patterns of genetic variation and integrates information on life history (e.g. run time). This will be achieved through the creation and analysis of a basin-wide, standardized database of allozyme and microsatellite DNA data. The specific population parameters that will be estimated are (i) population boundaries and times of divergence among populations, (ii) levels of gene flow, (iii) effective population sizes and determination of recent changes in population size (increases or decreases), and (iv) straying rates and levels of hybridization with hatchery-raised fish. These data will be supplemented with data on otolith microstructure to help confirm the stream of origin and age of sampled fish, and allow the discrimination of naturally produced and hatchery-reared individuals. The different datasets will be integrated to provide an ecosystem-level model of chinook population structure. This model can then be applied by the Central Valley MSCS Planning Team in recovery and restoration efforts. The strength of the present study is that it will build on an existing, standardized allozyme database for Pacific salmonids (Teel et al. 1999) and will employ two types of genetic markers for the study of the same samples in the same populations.

b. Conceptual model. Phenotypic or life history differences can be useful for identifying population units within a widespread species. The timing of adult freshwater migration has been applied to chinook salmon for this purpose. In the Central Valley, spring-, fall-, late fall, and winter-runs have been described (Slater 1963; Hallock and Fry 1967). These runs have also been associated with several other ecological characteristics including spawn timing, spawning habitat, juvenile rearing behavior, and patterns of ocean migration. Because of these associations, the temporal runs are sometimes referred to as "races", implying separate ancestries (e.g. McClane 1978). However, the genetic basis of phenotypic or life history traits is often unknown and, consequently, population differences in these traits do not necessarily reflect ancestral relationships among populations. Molecular genetic markers allow an independent assessment of the extent of reproductive isolation and ancestral relationships among groups and have been widely used for this purpose in chinook salmon (reviewed by Myers et al. 1998). Genetic studies have shown that life history classifications among populations sometimes reflect separate ancestral lineages and sometimes do not. For example, in British Columbia, genetic differences among life history types may reflect postglacial colonization by two ancestral lineages that survived in Pleistocene refugia (Teel et al. 2000). In the upper Columbia River, genetic data show that populations of spring-run chinook salmon have a separate ancestry from that of fall- and summer-run populations and that the lineages remain largely reproductively isolated from one another (Utter et al. 1995). In contrast, populations with differing run-times have been shown to be genetically similar (indicating recent common ancestry) in some tributaries of the Fraser (Teel et al. 2000), Skagit of Puget Sound (Marshall et al. 1995), Columbia (Utter et al. 1989), Rogue (Myers et al. 1998), and Klamath Rivers (Banks and Bartron 1999; Schiewe 1999). Run time diversity in these rivers probably results from relatively recent evolutionary events. Rapid

differentiation is also apparent in populations of chinook salmon transplanted to New Zealand in the early 1900's from the fall-run Battle Creek stock (Quinn and Unwin 1993; Quinn et al. 1996). After about 25 generations, the New Zealand populations have considerably more diversity in timing of juvenile emigration and adult return than is exhibited in the founding California population.

Clearly, a single "racial" model is not sufficient to describe the complexity of chinook salmon population genetic structure. An appropriate model for Central Valley chinook salmon will likely include both long-standing genetic lineages, often characterized by different life history traits (e.g. adult run timing), and populations which have diverged much more recently, some into different temporal runs. For Central Valley chinook salmon, existing genetic data suggest that an appropriate model for genetic population structure should (i) view Central Valley populations (of all run timings) as a long-standing genetic unit distinct from other Pacific chinook salmon and (ii) emphasize more recently diverged evolutionary lineages within the Central Valley that are aligned with adult run times (Figure 1). A comprehensive evaluation of genetic relationships among populations, particularly among temporal runs within the same river, is necessary to construct an accurate model of Central Valley chinook salmon.

c. Hypotheses being tested. The proposed study will test the following three hypotheses.

Hypothesis 1: Genetic data can be used to describe population structure at ecosystem, ESU, and local levels in Central Valley chinook salmon.

Hypothesis 2: Population structure of Central Valley chinook salmon is best represented by a complex model with populations that represent both old lineages and some that have recently diverged.

Hypothesis 3: Some populations of Central Valley chinook salmon in the same river with different adult run timing are completely reproductively isolated and represent old genetic lineages, while some are not and represent populations which have recently diverged.

d. Adaptive Management. CALFED's Comprehensive Monitoring, Assessment, and Research Program (CMARP) states "Appropriate and timely assessment of monitoring and research data is critical to effective adaptive management." This project will provide a standardized framework and the baseline research data for the assessment and monitoring of Central Valley chinook salmon populations using genetic methods. This will provide resource managers with a model of population structure and abundance necessary to design appropriate and effective recovery actions for chinook salmon populations. It will also allow the evaluation of the effects of ecosystem restoration (such as removal of barriers to migration) and species recovery actions on changes in population structure and abundance through future genetic monitoring programs. This can help guide the design of subsequent restoration actions and improve their overall effectiveness in meeting the CALFED's goal of "recovery" for all Central Valley chinook salmon populations.

The design of the sampling for this study was developed using results from previous genetic studies of Central Valley chinook salmon (reviewed by Myers et al. 1998; Schiewe 1999) and by identifying gaps in sampling conducted during the pilot program in 1998 and 1999 (Table 1). Genetic analyses of the 1998 and 1999 samples will be completed during fiscal year 2000. Results from these analyses will be used to appropriately modify the experimental design or develop new hypotheses for work in 2001-2003.

2. Proposed Scope of Work

a. Location and/or Geographic Boundaries of the Project. This evaluation will assess chinook salmon population structure throughout the Central Valley (Figure 2; Table 1). The populations to be examined are found within the following CALFED Ecological Zones (i) Sacramento River, (ii) North Sacramento Valley, (iii) Butte Basin, (iv) Feather River and Sutter Basin, (v) American River Basin, (vi) East Side

Delta Tributaries, (vii) East San Joaquin Basin, (viii) Colusa Basin, and (ix) Cottonwood Creek. These chinook salmon populations occur within Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Fresno, Glenn, Madera, Mariposa, Merced, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Stanislaus, Sutter, Tehama, Tuolumne, and Yuba counties.

Tisssue samples for allozyme analyses are already complete for certain chinook salmon populations (Table 1) including the San Joaquin River System. Tissue samples for DNA work are presently being collected for the San Joaquin River system as part of an existing CALFED contract. For these populations, no further sampling will be required to complete the proposed evaluation. The proposed study will complete the collection of tissue samples necessary for a proper understanding of population structure of Central Valley chinook salmon, with an emphasis on populations in the Sacramento River and its tributaries that presently support multiple temporal runs of chinook salmon (Table 1).

b. Approach. Numerous molecular genetic methods have been developed to survey genetic variation in fish populations. Grant et al. (1999) reviewed the advantages and limitations of many of these techniques and stressed their complementary nature for studying stock structure. A rigorous assessment of the genetic population structure of Central Valley chinook salmon should thus ideally include data from several differing molecular genetic techniques. The proposed study will build upon an existing allozyme database for Central Valley chinook salmon and integrate these allozyme data with data from microsatellite DNA.

We have selected allozyme and microsatellite DNA for the proposed study because both have proven to be effective in the study of chinook salmon population genetics. Allozymes (i.e. protein electrophoresis) permit the study of a large number of loci with relative ease, speed, and low cost. In addition, several laboratories have standardized and shared chinook salmon allozyme data since the mid 1980s. This collaboration has resulted in a species-wide database with data from over 250 chinook salmon populations in California, Oregon, Idaho, Washington, British Columbia, Alaska, and Russia (Teel et al. 1999). The database is applied to a wide array of chinook salmon management issues throughout North America, including the definition of state and federal conservation units (e.g. Marshall et al. 1995; Myers et al. 1998), the monitoring of effects of hatchery fish on wild populations (e.g. Waples et al 1990), and the estimation of stock contributions to ocean fisheries (e.g. Shaklee et al. 1990). Microsatellite DNA markers have also been used to study chinook salmon genetic variability, particularly in California (e.g. Nielsen et al. 1999; Banks et al. 2000) and British Columbia (Beacham et al. 1996). Microsatellite loci have a higher mutation rate than allozyme loci, which results in a larger numbers of alleles (genetic variants) and much more quickly accumulating differences between isolated populations. These genetic markers are capable of detecting genetic structure over much shorter periods of time and on much finer spatial scales than allozymes, making them ideal for identifying closely related populations and individuals. Moreover, the high variability inherent in these loci has been capitalized on to develop new methods for the estimation of population genetic parameters (e.g. Slatkin, 1995; Garza and Williamson 2000). The collection of tissues in the field is also much easier than for allozyme studies, because laboratory analyses of microsatellites utilize the polymerase chain reaction, which does not require large amounts of fresh starting material. However, in contrast to allozyme studies, different microsatellites loci have been used in different laboratories and geographically extensive datasets are not available. This is primarily because it is a relatively new technology and the time and cost of marker development is significant. However, the complementary types of information provided by allozymes and microsatellites have been considered analogous to the complementary uses of light and electron microscopy and both are necessary to provide a comprehensive assessment of Central Valley chinook salmon population structure.

Pre-proposal. Analysis of recent allozyme collections. During 1998 and 1999, CDFG and NMFS executed a pilot cooperative study to begin upgrading the existing allozyme database for chinook salmon in California. Approximately 1850 new tissues samples from 25 populations have been collected and are now being analyzed. The allozyme samples listed in Table 1 will be analyzed prior to the beginning of this project. The updated California database includes baseline genetic information on numerous

populations in Central Valley rivers, coastal rivers, and the Klamath River Basin. Population genetic structure of Central Valley chinook can therefore be studied at local scales and also directly compared to genetic differentiation of chinook salmon throughout California and in other regions.

Task 1. Quality Assurance Program Plan (QAPP). Develop and submit a QAPP to CALFED within one month of contract execution for review and approval before beginning field collection activities.

Task 2. Tissue Collection / Archive. CDFG will collect tissue samples for allozyme, otolith, and DNA analyses from fresh-spawned adult chinook salmon carcasses over the three-year study period. Sampling will be designed to collect fish throughout the entire spawning season in all targeted rivers. Information from redd surveys conducted by CDFG biologists will be used to identify stream reaches with spawning chinook salmon. Sampling will be designed to encompass all such areas. The goal is to collect at least 50, and if possible 100, samples from each potential population. Adjustments will be made each year in the sampling program to help meet this goal. Tissue samples taken from each fish will include eye, heart, liver, and cheek muscle (allozyme analysis), caudal fin clips and scale samples (DNA analyses) and otoliths. All samples will be labeled for cross-reference and processed at the CDFG Anadromous Salmonid Genetic Tissue Collection and Archive Project (Tissue Archive) according to existing protocols. according to existing protocols. Allozyme tissue samples will be frozen on dry ice immediately upon collection and shipped to the NMFS genetics laboratory at the Northwest Fisheries Science Center (NWFSC) for genetic analysis and storage. Samples collected for DNA analyses will be divided with one part shipped to the NMFS Southwest Fisheries Science Center (SWFSC) Santa Cruz laboratory for analysis and one portion stored at the Tissue Archive. Otoliths will be shipped to the CDFG Stream Evaluation Program Laboratory for analysis and storage.

Subtask 2.1 – First twelve months of tissue collection and archiving.
Subtask 2.2 – Second twelve months of tissue collection and archiving.
Subtask 2.3 – Final six months of tissue collection and archiving.

Task 3. Otolith Microstructure Analysis. Otolith microstructure will be analyzed to confirm the pattern of run timing for each fish sampled. Sagittal otoliths will be dissected and archived in tissue culture trays. Otoliths will be viewed with a light microscope and images digitized using either *Bony Parts* or *Image-Pro Plus* imaging software. Benchmarks such as the hatching check, first-feeding check, and changes in microstructural patterns associated with ambient conditions during migration (e.g. temperature, salinity) will be identified. Benchmarks will be both qualitatively evaluated through visual interpretation and measured. Measurements will include radial distances from the otolith primordium to the given check mark, and otolith increment (ring) widths in detectable growth zones observed past the first-feeding check. The number of daily rings will be counted in observed zones of the otolith corresponding to rearing by the fish in each growth zone. A scale sample will be taken from a sub-sample of individuals from each collection and cross-referenced with the corresponding otoliths with the same code.

Subtask 3.1 – First twelve months of otolith analysis. Run confirmation assigned to tissue samples.
Subtask 3.2 – Second twelve months of otolith analysis. Run confirmation assigned to tissue samples.
Subtask 3.3 – Final six months of otolith analysis. Run confirmation assigned to all tissue samples.
Subtask 3.4 – Report preparation final six months.

Task 4. Allozyme Analysis. Standardized methods of allozyme analysis will be used to survey up to 70 gene loci (Aebersold et al. 1987, Utter et al. 1987a) from approximately 350 fish per year. Genotype and allele frequency data will be computed for statistical analyses. Statistical analyses will include contingency table tests to examine differences in allele frequencies (Weir 1996). Cluster analysis such as multidimensional scaling (Kruskal 1964) and cluster dendrograms (Sneath and Sokal 1963) will be used

to analyze pairwise genetic distances. A hierarchical gene diversity analysis (Chakraborty et al. 1982) will be used to partition genetic variation into geographic and temporal levels. Results of the gene diversity and cluster analyses will be used to infer genetic relationships among populations with respect to life-history (run-time) information derived from otolith analysis, spawn time, and spawning location. The methods of Weir (1996) will be used to estimate levels of gene flow among populations, effective population sizes and times of divergence among populations. Allozyme data will be integrated with microsatellite data to develop comprehensive models of population structure that are consistent with observed patterns of genetic variation.

Subtask 4.1 – First twelve months of allozyme analysis.
Subtask 4.2 – Second twelve months of allozyme analysis.
Subtask 4.3 – Final six months of months of allozyme analysis.
Subtask 4.4 – Report preparation.
Subtask 4.5 – Presentation by Co-Principal Investigators to CALFED.

Task 5. DNA Analysis. A standardized set of at least 25 microsatellite loci will be examined in all collected samples and, where available, in archived samples previously analyzed with allozyme loci. These loci will include all markers previously typed in Central Valley chinook salmon populations (Table 1) and an additional set currently under development by the NMFS Santa Cruz Laboratory (J.C. Garza, unpublished data). Genetic distances will be calculated and a hierarchical analysis will be performed to determine fine-scale genetic population structure, both within rivers and for the entire ecosystem. Genetic relationships will be related to life-history data such as spawn timing, spawning location and information inferred in otolith analyses. Levels of gene flow between populations, effective population sizes and the demographic trajectory of populations will also be estimated (Goldstein, et al. 1995; Slatkin, 1995; Garza and Williamson 2000). Additionally, population-wide immigrant assignment tests will be performed to estimate the level of hybridization between hatchery and naturally spawned fish and to identify strays for genetic estimates of straying rates (Rannala and Mountain 1997; Cornuet et al. 1999). The relatively large number of markers (25) is necessary due to the high variance associated with statistics calculated from microsatellite data (Goldstein et al. 1995; Garza and Williamson, 2000). Microsatellite data will be integrated with allozyme data to develop comprehensive models of population structure that are consistent with observed patterns of genetic variation.

Subtask 5.1 – First twelve months of microsatellite analysis.
Subtask 5.2 – Second twelve months of microsatellite analysis.
Subtask 5.3 – Final six months of months of microsatellite analysis.
Subtask 5.4 – Report preparation.
Subtask 5.5 – Presentation by Co-Principal Investigators to CALFED.

Task 6. Project Management

Subtask 6.1 – Preparation of quarterly fiscal and programmatic reports.
Subtask 6.2 – Preparation of annual monitoring reports.
Subtask 6.3 – Preparation of final fiscal report to CALFED upon contract completion.
Subtask 6.4 – Annual coordination/review meetings of CDFG and NMFS project participants

c. Monitoring and Assessment Plans - A Quality Assurance Program Plan (QAPP) will be developed and submitted to CALFED for review and approval before beginning field collection activities.

d. Data Handling and Storage – The Tissue Archive will maintain an electronic information database of all samples collected, transmitted to the NMFS, and archived by CDFG for later analysis. Raw genotypic

data and allele frequency data will be compiled into the Pacific Rim Chinook Salmon Allozyme Database (Teel et al. 1999) and a new electronic database for microsatellite DNA data of California salmonids (created and managed by NMFS' geneticists). These databases will be available on request or on the internet. Results of data analysis will be described in reports submitted to CALFED and in scientific publications or technical reports.

e. Expected Products/Outcomes - Quarterly fiscal and programmatic reports will be submitted by the 10th day of the month following the end of each quarter (January, April, July, and October). The reports will summarize the activities and expenditures, broken down to specific task level that were performed during the previous quarter.

An Annual Monitoring Report summarizing sample and genetic data collections will be provided at the end of Years 1 and 2. The study's final report will provide a summary of each year's sample and genetic data collections and an analysis of otolith microstructure and genetic population structures as outlined above. Upon completion of the proposed work, all genetic and otolith data collected during the study will be made available to Central Valley chinook salmon recovery teams for application to individual restoration projects. Additionally, the databases will be made available by request or on the internet and it is expected that, in addition to the reports described above, the results of the analyses will be published in scientific publications or technical reports.

Three annual meetings will be held by the project Co-Principal Investigators. These meetings will serve as an opportunity for Co-Principal Investigators and other project personnel to assess project status and meet with CALFED for a program review. Progress towards completion of goals will be assessed and adjustments made as needed to meet project milestones and product deadlines will be incorporated. These meetings will also serve to discuss working hypotheses and project data, discuss how the project is contributing to improved ecosystem health, and to share information among project personnel.

f. Work Schedule. Table 2 outlines start dates, milestones, timeline, and completion dates for each task and subtask on a relative month basis (assuming the contract begins April 1, 2001).
Although all the tasks are necessary to provide a complete description of population genetic structure for Central Valley chinook salmon, incremental funding by CALFED would be possible for Tasks 1, 2, 6 combined and for Tasks 3, 4 and 5 separately. Funding for Task 2 (field collections) needs to include all three proposed years in order to acquire adequate numbers of tissue samples.

g. Feasibility. The proposed work and completion schedule is commensurate with the recent pilot genetic study of Central Valley chinook salmon completed by CDFG and NMFS (Table 1, Schiewe 1999).

CDFG has demonstrated its ability to reliably collect and archive anadromous salmonid tissue and perform otolith microstructure analysis. The Tissue Archive provided substantial support to the proposed evaluation's pilot study as well as to past and ongoing genetic studies (e.g. Nielsen et al. 1999; Schiewe 1999; Teel et al. 1999; Banks et al. 2000), including CALFED-funded studies (Developing a Genetic Baseline for San Joaquin Salmon - Proposal I121). CDFG is also performing otolith analysis under a CALFED contract for the comprehensive implementation plan of a statistically-designed marking/tagging program for Central Valley hatchery-produced chinook salmon and steelhead trout.

Geneticists at the NMFS have demonstrated expertise in population genetics techniques over the last three decades. NMFS geneticists have published extensively on chinook salmon genetics, including peer reviewed journal articles, book chapters, and technical reports. Several of those most pertinent to this proposal are included in the literature cited. A team of NMFS geneticists, including two of the co-principal investigators of the proposed study, recently completed coastwide status reviews of chinook salmon under NMFS' ESA mandates (Myers et al. 1998).

No state permit is required for CDFG to collect and process tissue samples taken from carcasses of adult chinook salmon. Although the California Endangered Species Act (CESA) generally prohibits the take or possession of live or dead animals that are listed by the State as threatened or endangered (in this

case, spring-run chinook salmon within the Central Valley) without a permit, State regulations expressly authorize CDFG employees and agents to take and possess these animals for scientific purposes (Title 14 California Code of Regulations, Section 783.1(c)).

CDFG believes this project falls within the Class 6 California Environmental Quality Act (CEQA) categorical exemption and that no CEQA environmental document need be prepared. Class 6 exempt activities consist of "basic data collection, research, experimental management and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource....". This exemption is appropriate because the project will not result in mortality or injury to a living animal listed under CEQA.

No Federal Endangered Species Act Section 10(a)1[A] Research Permit for scientific purposes is presently needed by the Department to collect the proposed chinook salmon tissue samples. CDFG will not be performing tissue collections of federally-listed endangered Sacramento winter-run chinook salmon. Winter-run tissue samples will be obtained from the U.S. Fish and Wildlife Service who possess a Section 10(a)1[A] Research Permit from NMFS to perform collections and sampling of Sacramento winter-run chinook salmon as part of the Winter-run Chinook Salmon Artificial Propagation Program. No Federal Endangered Species Act Section 10(a)1[A] Research Permit for scientific purposes is presently needed by the Department to collect Central Valley spring- or fall-/late fall-run chinook salmon tissues from carcasses since NMFS has not yet promulgated a 4(d) Rule prohibiting take of Central Valley chinook salmon. If, during the execution of the proposed three-year study, a 4(d) Rule is promulgated for Central Valley spring-or fall-/late fall-run chinook salmon and permits for scientific research are necessitated, the Department will request NMFS amend the Department's existing Section 10(a)1[A] Research Permit which presently authorizes specific levels of take for Sacramento winter-run chinook salmon. In such a case, NMFS would be the National Environmental Policy Act (NEPA) Lead Agency for authorizing take for scientific purposes.

If CDFG receives federal funding through CALFED, the Department believes this project qualifies for a categorical exclusion under NEPA because it is environmentally benign in the short term and should produce data that can be used to benefit fish species. The project qualifies as "...research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality or habitat destruction..." (Department of Interior Manual, Part 516, Chapter 6, Section 1.4 B (1)).

CDFG has the following public access for performing carcass tissue sampling: (i) American River, (ii) Battle Creek, (iii) Butte Creek, (iv) Big Chico Creek, (v) Clear Creek, (vi) Consumnes River, (vii) Feather River, (viii) Mokelumne River, (ix) Upper Sacramento River and, (x) Yuba River. CDFG has access permission across private land (see attached letters of permission) for Mill and Deer creeks. Assessment of where access sites are needed to perform tissue collection needs to be performed for all remaining waters in this proposal. Determination of preferred access locations will be performed during the spring/summer 2000. Permission will be acquired in concert with other CDFG field monitoring programs within a given watershed. CDFG will notify CALFED of any additional access sites within 30 days of notification of proposal approval.

Applicability to CALFED ERP Goals and Implementation Plan and CVPIA Priorities

1. ERP Goals and CVPIA Priorities

The proposed study of genetic population structure of Central Valley chinook salmon will conduct research identified as a priority in CALFED's ERP and MSCS as having the potential to meet the ERP's Strategic Goal 1 – At-Risk Species: "Achieve recovery of at-risk native species as the first step toward establishing large, self-sustaining populations of these species". All Central Valley chinook salmon populations are identified as "First Priority Species" for recovery by CALFED. Specifically, the proposed research will address the goals stated in the subsection "Fishery Monitoring Assessment, and Research". It will provide a "genetic assessment of Central Valley salmonids" and will improve and expand the inventory and assessment of fishery resources. The proposed research will also help to achieve Strategic Goal 3 – Harvestable Species, because of the fact that Central Valley chinook salmon are a harvested species.

A basin-wide framework for the understanding of genetic relationships among populations is crucial for the proper design and recovery and restoration efforts and can be used to refine management actions undertaken as part of CALFED's ERP. Moreover, the Viable Salmonid Populations(VSP) framework (McElhany 1999) defines genetic/life-history diversity of populations as one of four major categories upon which the status of populations will be assessed.

Additionally, knowledge of genetic population structure will also be necessary to assess the success and impact of habitat restoration projects (e.g. Clear Creek after removal of Saeltzer Dam and removal of migration barriers to adult chinook in Battle Creek) on chinook salmon through monitoring and assessment of pre- and post-project population composition.

Finally, study results will support effective management of programs such as artificial propagation and harvest (freshwater and ocean) for chinook salmon that reduces impacts to threatened and endangered salmon populations and facilitates their recovery in a manner consistent with ecosystem restoration (ERPP Vol. I, pages 510-518 and 519-524).

2. Relationship to Other Ecosystem Restoration Projects

This proposed evaluation will build upon existing products developed during previous genetics assessments for Central Valley chinook salmon (reviewed by CDFG 1998; Myers et al. 1998). The proposed study will also complement genetic and otolith microstructure studies funded by CALFED and presently underway: (i) Developing a Genetic Baseline for San Joaquin Salmon - Proposal I121; (ii) Genetic Comparison of Stocks Considered for Re-establishing Steelhead (*Oncorhynchus mykiss*) in Clear Creek, a Tributary to the Upper Sacramento River; (iii) Central Valley Steelhead Genetic Evaluation; and (iv) Development of a Comprehensive Implementation Plan for Central Valley Hatchery-Produced Chinook Salmon and Steelhead.

3. System-Wide Ecosystem Benefits

Because of the widespread nature of chinook salmon in the Central Valley and the broad scope of the proposed study, this research will have system-wide benefits. In addition, the standardized genetic database can be used in Genetic Stock Identification (GSI) (Milner et al. 1985) methods to estimate the stock compositions of chinook salmon caught in ocean fisheries. GSI provides crucial information on the harvest of untagged wild populations. GSI applications have documented the contributions of Central Valley chinook salmon to commercial fisheries extending from California to southern British Columbia (Milner et al. 1985; Utter et al. 1987b; Gall et al, 1989; Shaklee et al. 1990). Results of the proposed study will provide more accurate estimates of the contributions of both hatchery and wild Central Valley

chinook salmon to ocean fisheries, which constitute an important source of mortality for these populations.

An improved baseline genetic database for Central Valley chinook salmon will also add accuracy and provide additional information when GSI methods are applied to chinook salmon test fisheries. The California Department of Fish and Game and NMFS have sponsored several test fisheries since 1997 in California coastal waters to (i) evaluate the accuracy of certain stock distribution parameters which are used in ocean harvest models based on tag recovery data and (ii) provide contribution rate estimates of rarely encountered stocks (e.g. ESA-listed winter-run chinook), for which tag recovery data do not exist or are inadequate. Staff from CDFG's Ocean Salmon Project and NMFS' SWFSC and NWFSC have cooperated in studies to estimate the contribution rates of various chinook stocks to test fisheries both north and south of San Francisco Bay. The resulting estimates of the proportions of Klamath River fall-, Central Valley winter- and spring-run chinook salmon intercepted in these fisheries have played pivotal roles in harvest management decisions (e.g. Hogarth 1998; McInnis and Stelle 1999).

Finally, GSI techniques are also being used by NMFS geneticists to study the juvenile migration patterns of chinook salmon in the California Current as part of the U.S. Global Ocean Ecosystems Dynamics (GLOBEC) research program (project abstract can be viewed on the World Wide Web at http://www-welllab.biol.berkeley.edu/nep/projs.html). These investigations are coordinated with similar studies of juvenile chinook salmon in marine waters along much of the coast of North America. CALFED's ERP recognizes the importance of monitoring ocean conditions and potential affects on Central Valley chinook salmon (design report of the Comprehensive Monitoring Assessment and Research Program June 1999). Accurate genetic characterizations of populations in the Sacramento and San Joaquin rivers will be necessary to link regional ocean conditions with Central Valley chinook salmon.

Qualifications

Ms. Deborah McKee (CDFG) will oversee the study as Project Manager. Ms. McKee will also serve as Co-Principal Investigator. Ms. McKee has 19 years of experience in fisheries management, the last five years as the CDFG Recovery Coordinator for Threatened and Endangered Salmon. Ms. McKee was the principal author of CDFG's status review of spring-run chinook salmon in the Sacramento River drainage (CDFG 1998).

Mr. David Teel (NMFS, NWFSC) will serve as Co-Principal Investigator. Mr. Teel will coordinate the collection, management, analysis, and reporting of allozyme data for NMFS. Mr. Teel has over twenty years experience with the Genetics Program at the NWFSC. Present responsibilities include coordinator of the Pacific Rim Chinook Salmon Allozyme Database and principal investigator of GLOBEC Juvenile Salmon Genetic Stock Identification Study.

Dr. John Carlos Garza (NMFS, SWFSC, Santa Cruz Laboratory) will serve as Co-Principal Investigator and will coordinate the collection, management analysis, and reporting of microsatellite data. Dr Garza has more than 10 years experience working with DNA technology and has worked extensively on the theory and application of microsatellite and mitochondrial DNA to the study of natural populations. Dr. Garza is the leader of the genetics program at the NMFS Santa Cruz Laboratory.

Dr. Gary Winans (NMFS, NWFSC) will serve as Co-Principal Investigator and conduct analysis of genetic data. Dr. Winans has over twenty years experience with the NWFSC Genetics Program. Present responsibilities include lead geneticist for NMFS' Pacific Salmon Treaty Genetic Stock Identification Study and Columbia Basin Steelhead Genetics studies.

Dr. Jim Myers (NMFS, NWFSC) will serve as Co-Principal Investigator and conduct analysis of genetic data. Dr. Myers has over fifteen years experience as a Research Fishery Biologist, the last five with the Conservation Biology Division at the NWFSC. Dr. Myers leads NMFS' ESA Status Reviews for chinook salmon and is principal investigator of the GLOBEC Juvenile Salmon Genetic Stock Identification Study.

Mr. Bill Snider (CDFG) will act as Co-Principal Investigator and supervise the otolith microstructure research task. Mr. Snider is a graduate of the University of California at Davis and has 28 years of experience with CDFG, including 20 years experience with the Stream Evaluation Program of the Native Anadromous Fish and Watershed Branch. Currently, as supervisor of the Stream Evaluation Program, Mr. Snider oversees monitoring and research on anadromous salmonids in the Central Valley, including investigations on population dynamics, habitat relationships and life history strategies of chinook salmon and steelhead.

Dr. Robert Titus (CDFG) will serve as a Co-Principal Investigator. Dr. Titus will be primarily responsible for performing the otolith analysis and reporting the results. Dr. Titus has worked on the CDFG Stream Evaluation Program for 7 years and has 12 years of experience working on anadromous salmonids, including various salmon and steelhead monitoring programs and applications of otolith microstructure analysis to evaluate population structure and life history strategy relationships with habitat conditions.

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Cost

1. Budget

The total budgeted costs requested from CALFED for this proposal (assuming an 18.54% administrative overhead rate for State funds) is $1,321,585. This cost is based on three years of field collection, three years of laboratory analysis of otoliths, allozyme, and DNA, and a final report summarizing the study's findings. The breakdown of these costs are displayed to the subtask level in Table 3a (using an 18.54% administrative overhead rate for State funds) and Table 3b (using a 20% administrative overhead rate for Federal funds) and allocated across the cost categories as specified in the Proposal Solicitation Package.

The personnel costs for Task 2 (Tissue Collection and Archive) are based on CDFG utilizing seven Scientific Aids for nine months each during Year 1 and Year 2 and six person-months during Year 3 to perform field sampling. Staff benefits are based on the current State factor of 7.66% for estimating employee benefits' costs for temporary staff. Operating expenses (including rent, telephones, general office staff support, travel, field and laboratory supplies including chemicals, and the lease of two vehicles totals $40,800 each for Year 1 and Year 2. In Year 3, operating expenses total $26,990.

Tissue storage will require the purchase of two ultra-cold (-80F) freezers during Year 1 at $10,000 each. One freezer will be located at CDFG's Red Bluff offices where one of the two teams of field staff will be located throughout the course of the study. The second freezer will be located at the Tissue Archive Laboratory in Rancho Cordova. Purchase of a third freezer will be needed in Year 2 at a cost of $10,000. A portion of all samples will be archived and made available to qualified researchers upon request. Project costs for tissue collection also include a one-time expenditure of $2,500 for a boat motor and $2,500 for a computer to maintain the tissue sample data records.

The personnel costs for Task 3 (Otolith Microstructure Analysis) are based on CDFG utilizing Scientific Aids for a total of 24 person-months during Year 1 and Year 2 and a total of 12 person-months during Year 3 to prepare and analyze the otoliths under the direct supervision of CDFG Associate and Senior Biological staff. Operating expenses are for the cost of chemicals and minor supplies for performing the microstructure analysis.

The Service Contract will consist of an agreement with NMFS for performing the allozyme (Task 4) and DNA analyses (Task 5). The Service Contract cost is $206,244 for Year 1, $137,038 for Year 2, and $130,780 for Year 3. A team of four Fishery Biologists and one Geneticist (David Teel, Dr. Jim Myers, Don Van Doornik, David Kuligowski, and Dr. Gary Winans) will perform the allozyme analysis. The direct labor hours total 880 each year for a cost of $45,465 each year. Supplies and expenses total $10,000 each year for the allozyme analysis. Total labor for preparation of the report summarizing results of the allozyme analysis is 320 hours for a cost of $20,394. NMFS salaries for team members range from $41.25 to $21.25 per hour. The standard NMFS benefit rate is 22.3%. The overhead rate (for salaries and benefits) is 64%. The combined cost for David Teel, Dr. Jim Myers, and Dr. Gary Winans to travel to the annual meeting with CDFG per Task 6.4 is $2,520 per year.

The personnel costs for performing the DNA analysis (Task 5) are based on a total 5200 total labor hours over three years for a team of Scientific Aids at $13.97 an hour per person. Cost for performing DNA analysis includes $62,500 for laboratory supplies over three years and $69,206 for purchase of analytical equipment in Year 1. The personnel costs for preparation of the report summarizing results of the DNA analysis is based on 260 total labor hours for Dr. John Carlos Garza at cost of $12,624. The cost for Dr. John Carlos Garza to travel to the annual meeting with CDFG per Task 6.4 is $500 per year.

2. Cost-Sharing

There are no cost-sharing requirements for the proposed project. However, cost-sharing will occur in the form of in-kind services of permanent staff time, equipment, and facilities by CDFG and the NMFS. CDFG is providing $316,940 in staff time for project management, field and laboratory staff supervision, tissue processing, archiving, otolith analysis, and report preparation. In addition to this amount, CDFG is providing existing facilities and equipment associated with the Tissue Archive and Otolith Laboratory.

NMFS is providing $112,454 in staff time for Project Management, allozyme and DNA analysis, and report preparation. Additionally, the Northwest Fisheries Science Center and the Southwest Fisheries Science Center are each providing offices and laboratory spaces, laboratory equipment, computers, and miscellaneous supplies equal to $100,000 to the project. The NMFS Santa Cruz Laboratory facilities include full technical and logistic support, an Applied BioSystems 377 automated DNA sequencer, 3 PCR machines, centrifuges, two desktop supercomputers and all other necessary pieces of equipment to perform the proposed research.

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Local Involvement

CDFG has transmitted letters to all County Supervisor offices and their planning divisions notifying them of our proposal to CALFED (Attachments). CDFG has also transmitted letters to the various Resource Conservation Districts and local watershed organizations throughout the Central Valley who may be interested or affected by the project. CDFG's Anadromous Fisheries Restoration Coordinators meet on a regular basis with local watershed organizations and government and will provide continued contact throughout the course of the study.

There will be no third-party impacts. All access for field activities will be from public land or across private property where permission for access is granted by the landowner in writing.

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Compliance with Standard Terms and Conditions

The applicant has reviewed the State and Federal standard terms contained in Attachments D (State) and E (Federal) and will comply with all terms.

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California and southern Oregon chinook salmon

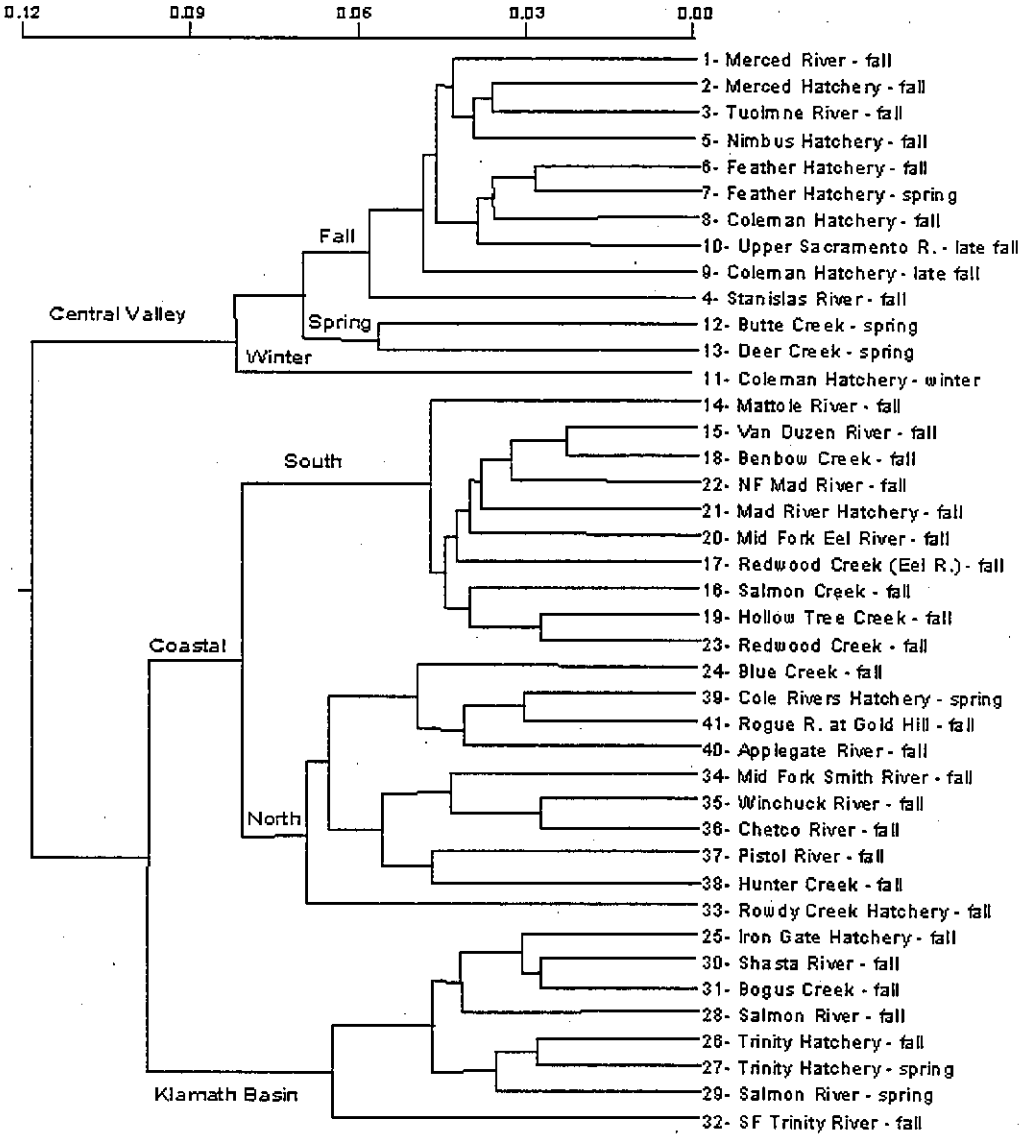

Figure 1. UPGMA dendrogram of Cavalli-Sforza and Edward (1967) chord distances based on 34 allozyme loci between 41 composite samples of chinook salmon from California and southern Oregon. From Schiewe 1999.

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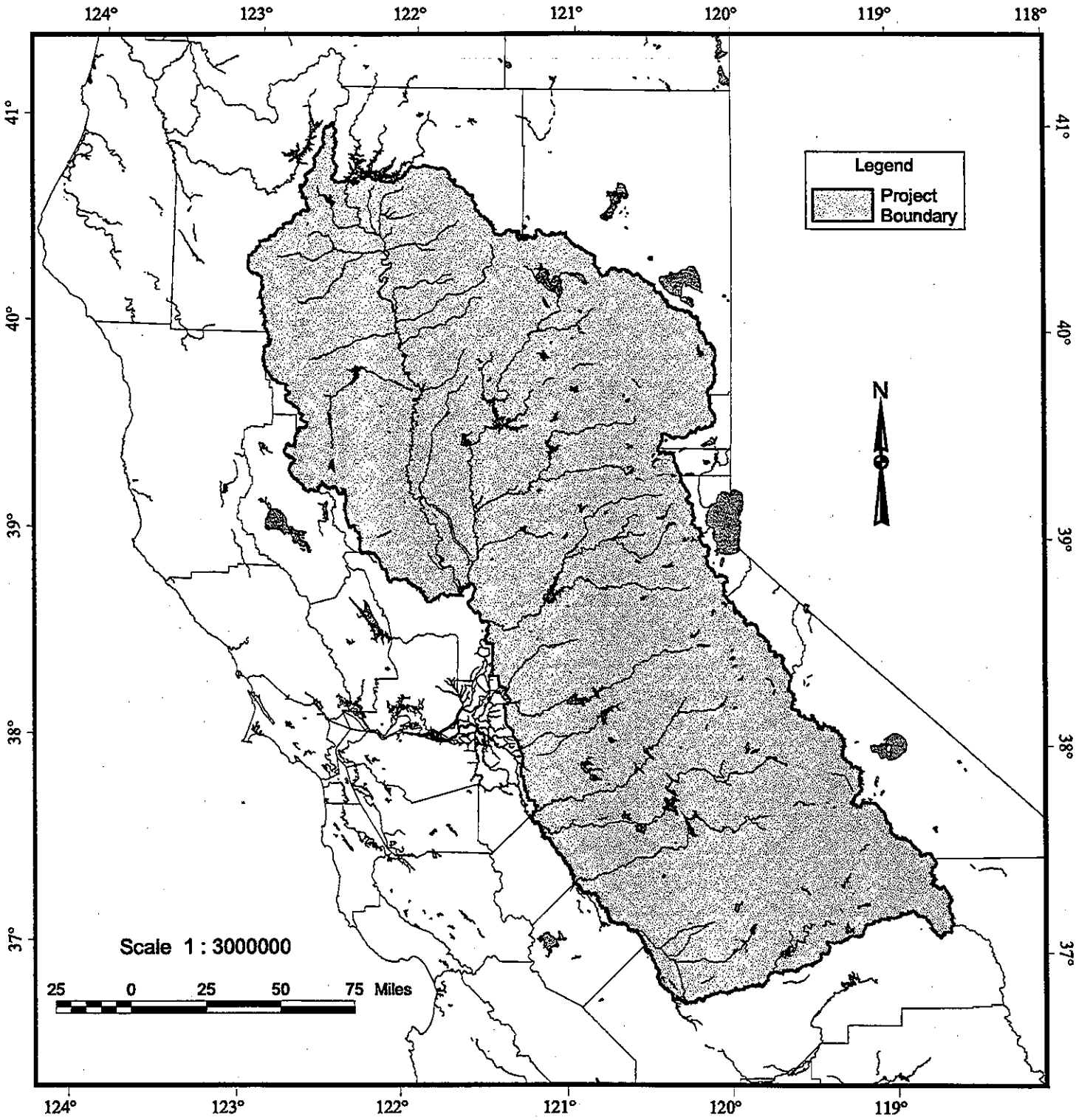

Geographic Project Boundary for Genetic Population Structure of Central Valley Chinook Salmon Evaluation May 4, 2000

State of California
The Resources Agency
Department of Fish and Game
Native Anadromous Fish
and Watershed Branch

Figure 2

Teale Albers
Projection: Albers
Units: Meters
Datum: NAD27
1st standard parallel: 34 0 0.000
2nd standard parallel: 40 30 0.000
Central meridian: -120 0 0.000
Latitude of projection's origin: 0 0 0.000
False easting (meters): 0.00000
False northing (meters): -4000000.00000

Table 1. Central Valley Chinook Salmon Genetic Samples

Sample Source	Run	Previous Allozyme Samples (Year)	Previous DNA Samples (Year) [1/]	Previous DNA Samples (Year) [2/]	Additional Samples (Years 2001-2003)
American River	Fall	11 (1998) 71 (1999) Total = 82	90 (1995)	5 (1994) 21 (1995) 9 (1996) Total = 35	50
Antelope Creek	Fall				100
Antelope Creek	Spring				100
Battle Creek	Fall	43 (1999)			50
Battle Creek	Late-fall				100
Battle Creek	Spring				100
Beegum Creek (tributary to Cottonwood Creek)	Spring				100
Big Chico Creek	Fall				100
Big Chico Creek	Spring				100
Butte Creek	Fall	1 (1999)			100
Butte Creek	Spring	50 (1998) 52 (1999) Total = 102	67 (1994) 41 (1996) 35 (1996) [3/] 117 (1997) Total = 260	26 (1993) 59 (1994) 28 (1995) 10 (1996) 14 (1997) Total = 137	50
Clear Creek	Fall				100
Clear Creek	Late-fall				100
Clear Creek	Spring				100
Coleman NFH Hatchery	Fall		144 (1993) 95 (1994) 95 (1995) Total = 334	30 (1994) 30 (1995) Total = 60	None
Coleman NFH Hatchery	Late-fall	80 (1999)	143 (1993) 90 (1995) Total = 233	34 (1995) 26 (1996) 23 (1997) Total = 83	None
Coleman NFH Hatchery / Livingston Stone Hatchery	Winter	51 (1998)			100
Consumnes	Fall				100
Cottonwood Creek	Fall				100

Table 1. Central Valley Chinook Salmon Genetic Samples

Sample Source	Run	Previous Allozyme Samples (Year)	Previous DNA Samples (Year) [1/]	Previous DNA Samples (Year) [2/]	Additional Samples (Years 2001-2003)
Cottonwood Creek	Late-fall				100
Deer Creek	Fall				100
Deer Creek	Late-fall				100
Deer Creek	Spring	32 (1998) 27 (1999) Total = 59	30 (1994) [3/] 25 (1995) 73 (1996) [3/] 49 (1997) Total = 177	25 (1992) 51 (1993) 1 (1994) 19 (1995) 21 (1997) Total = 117	50
Feather River	Fall	45 (1999)	75 (1995) 53 (1996) Total = 128	2 (1994) 11 (1995) 3 (1996) Total = 16	50
Feather River	Spring	39 (1999)			60
Feather River Hatchery	Fall	100 (1999)		50 (1993) 59 (1994) 30 (1995) 30 (1996) Total = 169	50
Feather River Hatchery	Spring	30 (1999)			50
Feather River sport fishery	Spring				50
Feather River sport fishery	Spring				50
Merced River	Fall	40 (1998) 99 (1999) Total = 139	88 (1995)	12 (1994) 22 (1995) 23 (1996) Total = 57	None
Merced River Hatchery	Fall	80 (1998) 104 (1999) Total = 184	95 (1995)	28 (1992) 36 (1993) 45 (1994) 30 (1995) 27 (1996) Total = 166	None
Mill Creek	Fall				100
Mill Creek	Late-fall				100

Table 1. Central Valley Chinook Salmon Genetic Samples

Sample Source	Run	Previous Allozyme Samples (Year)	Previous DNA Samples (Year) [1/]	Previous DNA Samples (Year) [2/]	Additional Samples (Years 2001-2003)
Mill Creek	Spring		15 (1995) 40 (1996) [3/] Total = 55	41 (1995)	100
Mokelumne River	Fall		94 (1995)	30 (1994) 29 (1995) 23 (1996) Total = 82	100
Mokelumne River Hatchery	Fall		95 (1995)	59 (1994) 27 (1995) 25 (1996) Total = 111	100
Nimbus Hatchery	Fall	77 (1999)	95 (1995)	52 (1993) 58 (1994) 29 (1995) 30 (1996) Total = 169	50
Stanislaus River	Fall	25 (1998) 80 (1999) Total = 105	26 (1994) 27 (1995) Total = 53	8 (1994) 12 (1995) Total = 20	None
Tuolumne River	Fall	35 (1998) 104 (1999) Total = 139	15 (1994) 29 (1995) 78 (1996) Total = 122	8 (1994) 12 (1995) Total= 20	None
Upper Sacramento River	Fall	8 (1998) 184 (1999) Total – 192	94 (1995)		None
Upper Sacramento River	Late-fall	120 (1999) 38 (2000) Total = 158	90 (1995) [4/]	34 (1992) 31 (1995) Total= 65	None
Upper Sacramento River	Spring	4 (1999)			100 [6/]

Table 1. Central Valley Chinook Salmon Genetic Samples

Sample Source	Run	Previous Allozyme Samples (Year)	Previous DNA Samples (Year) [1/]	Previous DNA Samples (Year) [2/]	Additional Samples (Years 2001-2003)
Upper Sacramento River	Winter	198 (1999)	29 (1992) [4/] 26 (1994) [4/] 37 (1995) [4/] 18 (1991) [5/] 11 (1993) [5/] 32 (1995) 36 (1996) 103 (1997) Total = 292	25 (1995) 25 (1996) 34 (1997) Total= 84	None
Yuba River	Fall	1 (1998) 27 (1999) Total = 28	54 (1996)	18 (1995)	100
Yuba River	Late-fall				100
Yuba River	Spring				100

1/ DNA Samples as reported in Banks et al. 2000. Microsattelite loci used: Ots-1, -2, -3, -5, -9, -10, -104, -107, Oneμ13, and Omy-77.

2/ DNA Samples as reported in Nielsen et al. 1999. Microsattelite loci used: Ots-1, Ots-2, Ots-4, Oneμ13, Omy-77, Omy-325, Ssa-4, Ssa-14, Ssa-85, and Ssa-289.

3/ Samples collected from outmigrating juveniles instead of carcasses.

4/ Collection was made at Keswick Dam Fish Trap

5/ Collection was made at Keswick Dam Fish Trap and Red Bluff Division Dam

6/ Collection to be made at Keswick Dam Fish Trap. Fin Clip only. To be collected by USFWS personnel.

Table 2. Timeline for Conducting Baseline Genetic Population Structure of Central Valley Chinook Salmon. (Relative Schedule and Milestone dates assuming Contract signed April 2001)

Task	Task Title	Relative Milestones: Year 1 Quartiles	Year 2 Quartiles	Year 3 Quartiles	Relative Completion Schedule
	Sign Contract with CALFED				April 2001
1	**Quality Assurance Program Plan.** Submit to CALFED within one month of contract execution for review and approval before beginning field collection activities.				One month May 2001
2	**Tissue Collection / Archive**				
2.1	First 12 months of tissue collection and archiving.				June 2001 through May 2002
2.2	Second 12 months of tissue collection and archiving.				June 2002 through May 2003
2.3	Final 6 months of tissue collection and archiving.				June 2003 through November 2003
3	**Otolith Microstructure Analysis**				
3.1	First 12 months of otolith analysis.				June 2001 through May 2002
3.2	Second 12 months of otolith analysis.				June 2002 through May 2003
3.3	Final 6 months of otolith analysis.				June 2003 through November 2003
3.4	Report preparation.				December 2003 through March 2004
4	**Allozyme Analysis**				
4.1	First 12 months of allozyme analysis.				June 2001 through May 2002
4.2	Second 12 months of allozyme analysis.				June 2002 through May 2003
4.3	Final 6 months of allozyme analysis.				June 2003 through January 2004

Table 2. Timeline for Conducting Baseline Genetic Population Structure of Central Valley Chinook Salmon. (Relative Schedule and Milestone dates assuming Contract signed April 2001)

Task	Task Title	Relative Milestones: Year 1 Quartiles / Year 2 Quartiles / Year 3 Quartiles	Relative Completion Schedule
4.4	Report preparation and presentation to CALFED.		January 2004 through April 2004
5	**DNA Analysis**		
5.1	First 12 months of microsatellite analysis.		June 2001 through May 2002
5.2	Second 12 months of microsatellite analysis.		June 2002 through May 2003
5.3	Final 6 months of microsatellite analysis.		June 2003 through January 2004
5.4	Report preparation and presentation to CALFED.		January 2004 through April 2004
6	**Project Management**		
6.1	Quarterly Reports Fiscal and programmatic reports will be submitted quarterly. Two working days expended per reporting period.		10th day of the month following the end of each quarter (January, April, July, and October).
6.2	Annual Monitoring Report will be provided at the end of Year 1 and Year 2 summarizing sample and genetic data collections to date. One week per year.		April 2002 April 2003
6.3	Final Fiscal Report		April 2004
6.4	Annual Meetings (3-days each) between CDFG and NMFS Co-Principal Investigators.		May 2001 May 2002 May 2003 March 2004

Table 3a. Annual and total budget for Genetic Population Structure of Central Valley Chinook Salmon (with 18.54% overhead rate for State funded reimbursements)

Year	Task [1/]	Direct Labor Hours	Subject to Overhead							Exempt From Overhead	Total Cost
			Salary	Benefits	Travel	Supplies & Expendables	Equipment	Service Contracts	Overhead (18.54%)	Graduate Student Fee Remission	
Year 1	Task 2 Tissue Collection and Archive										
	Task 2.1	10920	$124,597	$9,532	$10,800	$30,000	$25,000		$37,067		$236,996
	Task 3 Otolith Microstructure Analysis										
	Task 3.1	4160	$47,466	$3,631		$2,400			$9,918		$63,415
	Task 4 Allozyme Analysis										
	Task 4.1							$55,465	$10,283		$65,748
	Task 5 DNA Analysis										
	Task 5.1							$147,759	$27,395		$175,154
	Task 6 Project Management										
	Task 6.4							$3,020	$560		$3,580
Total Cost Year 1			$172,063	$13,163	$10,800	$32,400	$25,000	$206,244	$85,223	$0	$544,892
Year 2	Task 2 Tissue Collection and Archive										
	Task 2.2	10920	$124,597	$9,532	$10,800	$30,000	$10,000		$34,286		$219,215
	Task 3 Otolith Microstructure Analysis										
	Task 3.2	4160	$47,466	$3,631		$2,400			$9,918		$63,415
	Task 4 Allozyme Analysis										
	Task 4.2							$55,465	$10,283		$65,748
	Task 5 DNA Analysis										
	Task 5.2							$78,553	$14,564		$93,117
	Task 6 Project Management										
	Task 6.4							$3,020	$560		$3,580
Total Cost Year 2			$172,063	$13,163	$10,800	$32,400	$10,000	$137,038	$69,611	$0	$445,075
Year 3	Task 2 Tissue Collection and Archive										

Table 3a. Annual and total budget for Genetic Population Structure of Central Valley Chinook Salmon (with 18.54% overhead rate for State funded reimbursements)

Year	Task [1/]	Direct Labor Hours	Subject to Overhead							Exempt From Overhead	
			Salary	Benefits	Travel	Supplies & Expendables	Equipment	Service Contracts	Overhead (18.54%)	Graduate Student Fee Remission	Total Cost
	Task 2.3	7280	$83,065	$6,354	$7,200	$19,790	$0		$21,582		$137,992
	Task 3 Otolith Microstructure Analysis										
	Task 3.3	1920	$21,907	$3,352		$1,200			$4,905		$31,364
	Task 3.4	816	$16,157	$2,571					$3,472		$22,200
	Task 4 Allozyme Analysis										
	Task 4.3							$55,465	$10,283		$65,748
	Task 4.4							$20,394	$3,781		$24,175
	Task 5 DNA Analysis										
	Task 5.3							$39,277	$7,282		$46,559
	Task 5.4							$12,624	$2,340		
	Task 6 Project Management										
	Task 6.4							$3,020	$560		$3,580
Total Cost Year 3			$121,129	$12,277	$7,200	$20,990	$0	$130,780	$54,207	$0	$331,618
Total Project Cost			**$465,254**	**$38,603**	**$28,800**	**$85,790**	**$35,000**	**$474,062**	**$209,040**	**$0**	**$1,321,585**

1/ Tasks not included in the above table are being funded through in-kind services by CDFG and NMFS.

Table 3b. Annual and total budget for Genetic Population Structure of Central Valley Chinook Salmon (with 20% overhead rate for Federal funded reimbursement)

Year	Task [1/]	Direct Labor Hours	Subject to Overhead							Exempt From Overhead Graduate Student Fee Remission	Total Cost
			Salary	Benefits	Travel	Supplies & Expendables	Equipment	Service Contracts	Overhead (20 %)		
Year 1	Task 2 Tissue Collection and Archive										
	Task 2.1	10920	$124,597	$9,532	$10,800	$30,000	$25,000		$39,986		$239,915
	Task 3 Otolith Microstructure Analysis										
	Task 3.1	4160	$47,466	$3,631		$2,400			$10,699		$64,196
	Task 4 Allozyme Analysis										
	Task 4.1							$55,465	$11,093		$66,558
	Task 5 DNA Analysis										
	Task 5.1							$147,759	$29,552		$177,311
	Task 6 Project Management										
	Task 6.4							$3,020	$604		$3,624
Total Cost Year 1			$172,063	$13,163	$10,800	$32,400	$25,000	$206,244	$91,934	$0	$551,604
Year 2	Task 2 Tissue Collection and Archive										
	Task 2.2	10920	$124,597	$9,532	$10,800	$30,000	$10,000		$36,986		$221,915
	Task 3 Otolith Microstructure Analysis										
	Task 3.2	4160	$47,466	$3,631		$2,400			$10,699		$64,196
	Task 4 Allozyme Analysis										
	Task 4.2							$55,465	$11,093		$66,558
	Task 5 DNA Analysis										
	Task 5.2							$78,553	$15,711		$94,264
	Task 6 Project Management										
	Task 6.4							$3,020	$604		$3,624
Total Cost Year 2			$172,063	$13,163	$10,800	$32,400	$10,000	$137,038	$75,093	$0	$450,556
Year 3	Task 2 Tissue Collection and Archive										

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Table 3b. Annual and total budget for Genetic Population Structure of Central Valley Chinook Salmon (with 20% overhead rate for Federal funded reimbursement)

Year	Task [1/]	Direct Labor Hours	Subject to Overhead							Exempt From Overhead Graduate Student Fee Remission	Total Cost
			Salary	Benefits	Travel	Supplies & Expendables	Equipment	Service Contracts	Overhead (20 %)		
	Task 2.3	7280	$83,065	$6,354	$7,200	$19,790	$0		$23,282		$139,691
	Task 3 Otolith Microstructure Analysis										
	Task 3.3	1920	$21,907	$3,352		$1,200			$5,292		$31,751
	Task 3.4	816	$16,157	$2,571					$3,746		$22,474
	Task 4 Allozyme Analysis										
	Task 4.3							$55,465	$11,093		$66,558
	Task 4.4							$20,394	$4,079		$24,473
	Task 5 DNA Analysis										
	Task 5.3							$39,277	$7,855		$47,132
	Task 5.4							$12,624	$2,525		
	Task 6 Project Management										
	Task 6.4							$3,020	$604		$3,624
Total Cost Year 3			$121,129	$12,277	$7,200	$20,990	$0	$130,780	$58,475	$0	$335,703
Total Project Cost			**$465,254**	**$38,603**	**$28,800**	**$85,790**	**$35,000**	**$474,062**	**$225,502**	**$0**	**$1,337,863**

1/ Tasks not included in the above table are being funded through in-kind services by CDFG and NMFS.

State of California - The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

ORIGINAL
GRAY DAVIS, Governor

May 8, 2000

Merced County
Mr. Robert Smith
2222 M Street
Merced, CA 95340

Dear Mr. Smith:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

If you have any questions, I can be reached at (916) 653-8983 for additional information.

Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

Conserving California's Wildlife Since 1870

State of California - The Resources Agency
GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Yuba County Board of Supervisors
215 Fifth Street
Marysville, CA 95901

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Tuolumne County Board of Supervisors
2 South Green Street
Sonora, CA 95370

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Habitat Conservation Division
Native Anadromous Fish
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Recovery Coordinator

cc: Planning Department

Conserving California's Wildlife Since 1870

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GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Tehama County Board of Supervisors
332 Pine Street
Red Bluff, CA 96080

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

Deborah E. McKee

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Habitat Conservation Division
Native Anadromous Fish
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Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Sutter County Board of Supervisors
1160 Civic Center Blvd.
Yuba City, CA 95993

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
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Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

Conserving California's Wildlife Since 1870

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GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Stanislaus County Board of Supervisors
1100 H Street
Modesto, CA 95354

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

Deborah McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
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Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

Conserving California's Wildlife Since 1870

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Shasta County Board of Supervisors
1815 Yuba Street, Suite 1
Redding, CA 96001

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Habitat Conservation Division
Native Anadromous Fish
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Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

San Joaquin County Board of Supervisors
222 East Weber Avenue, Room 701
Stockton, CA 95202

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

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Habitat Conservation Division
Native Anadromous Fish
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Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Sacramento County Board of Supervisors
700 H Street
Sacramento, CA 95814

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Deborah C. McKee

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Habitat Conservation Division
Native Anadromous Fish
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Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Plumas Board of Supervisors
520 West Main Street, Courthouse
Quincy, CA 95971

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

If you have any questions, I can be reached at (916) 653-8983 for additional information.

Sincerely,

Deborah McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
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Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Placer County Board of Supervisors
175 Fulweiler Avenue
Auburn, CA 95603

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

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State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

ORIGINAL

May 8, 2000

Nevada County Board of Supervisors
950 Maidu Avenue
Nevada City, CA 95959

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

May 8, 2000

Merced County Board of Supervisors
2222 M Street
Merced, CA 95340

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
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Recovery Coordinator

cc: Planning Department

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Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Mariposa County Board of Supervisors
5100 Bullion Street
Mariposa, CA 95338

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

If you have any questions, I can be reached at (916) 653-8983 for additional information.

Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

cc: Planning Department

Conserving California's Wildlife Since 1870

State of California - The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Alpine County Board of Supervisors
P.O. Box 158
Markleeville, CA 96120

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

ORIGINAL

May 8, 2000

Madera County Board of Supervisors
209 West Yosemite Avenue
Madera, CA 93637

Dear Supervisors:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Amador County Board of Supervisors
500 Argonaut Lane
Jackson, CA 95642

Dear Supervisors:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Glenn County Board of Supervisors
526 West Sycamore Sstreet
Willows, CA 95988

Dear Supervisors:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Fresno County Board of Supervisors
1100 Van Ness
Fresno, CA 93721

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

El Dorado County Board of Supervisors
3300 Fair Lane
Placerville, CA 95667

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Calaveras County Board of Supervisors
891 Mountain Ranch Road
San Andreas, CA 95249

Dear Supervisors:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Colusa County Board of Supervisors
546 Jay Street
Colusa, CA 95932

Dear Supervisors:

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1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

ORIGINAL

May 8, 2000

Butte County Board of Supervisors
25 County Center Drive
Oroville, CA 95965

Dear Supervisors:

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1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

ORIGINAL

May 8, 2000

Glenn County
Resource Conservation District
132 N. Enright, Suite B
Willows, CA 95988

Gentlemen:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Feather River
Resource Conservation district
48228 Hwy 70
Quincy, CA 95971

Gentlemen:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Tehama County
Resource Conservation District
2 Sutter Street #D
Red Bluff, CA 96080

Gentlemen:

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1416 Ninth Street
Sacramento, CA 95814

GRAY DAVIS, Governor

(916) 653-8983

May 8, 2000

Western Shasta
Resource Conservation District
3179 Bechelli Lane #107
Redding, CA 96002

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Amador County
Resource Conservation District
10590 Sunset Drive, Suite 7
Jackson, CA 95642

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Conserving California's Wildlife Since 1870

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

El Dorado
Resource Conservation District
415 Placerville Drive #M
Placerville, CA 95667

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DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Colusa County
Resource Conservation District
100 Sunrise Blvd. #8
Colusa, CA 95932

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Lower Consumnes Lower Consumnes
Resource Conservation District
2001 Vesta Way
Sacramento, CA 95864

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Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Sutter County
Resource Conservation District
1511B Butte House Road
Yuba City, CA 95993

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GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

West Stanislaus
Resource Conservation District
P.O. Box 573
Patterson, CA 95363

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http://www.dfg.ca.gov
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Sacramento, CA 95814
(916) 653-8983

ORIGINAL

May 8, 2000

Stanislaus Stakeholder Group
Ms. Meri Moore
2800 Cottage Way
Sacramento, CA

Dear Ms. Moore:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

S.P. Cramer & Associates, Inc.
Mr. Steven Cramer
300 S.E. Arrow Creek Lane
Gresham, OR 97080

Dear Mr. Cramer:

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Community Resource Center
Mr. Steven Burke
1024 J St., Suite 312
Modesto, CA 95354

Dear Mr. Burke:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Ms. Jennifer Vick
2532 Durant Ave., Suite 201
Berkeley, CA 94704

Dear Ms. Vick:

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(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Tuolumne River Preservation Trust
Ms. Jenna Olsen
Fort Mason, Building C
San Francisco, CA 94123

Dear Ms. Olsen:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Merced Irrigation District
E.C. Selb III
P.O. Box 2288
Merced, CA 95344-0288

Dear Mr. Selb:

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Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Mr. Steve Felte
Tri-Dam Project
P.O. Box 1158
Pinecrest, CA 95364

Dear Mr. Felte:

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(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Turlock Irrigation District
Tuolumne Advisory Committee
333 East Canal Drive
Turlock, CA 95381

Dear Gentlemen:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

If you have any questions, I can be reached at (916) 653-8983 for additional information.

Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

Conserving California's Wildlife Since 1870

State of California - The Resources Agency
GRAY DAVIS, Governor

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Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Turlock Irrigation District
Mr. Tim Ford
333 East Canal Drive
Turlock, CA 95381

Dear Mr. Ford:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Merced River Technical Advisory
Merced River Stakehold Group
2222 M Street
Merced, CA 95340

Dear Gentlemen:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Modesto Irrigation District
1231 11th Street
Modesto, CA 95352

Dear Gentlemen:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Friends of the Tuolumne
Mr. Dave Boucher
2412 Hilo Lane
Ceres, CA 95307

Dear Mr. Boucher:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Ms. Anne Read
Battle Creek Watershed Cons.
1 Sutter Street, Ste. D
Red Bluff, CA 96080

Dear Ms. Read:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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(916) 653-8983

May 8, 2000

Ms. Laurie Aumack
Battle Creek Conservency
2 Sutter Street, Ste. D
Red Bluff, CA 96080

Dear Ms. Aumack:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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GRAY DAVIS, Governor

May 8, 2000

Mrs. Suzanne Gibbs
Big Chico Creek Watershed Alliance
602 Sycamore Street
Chico, CA 95928

Dear Mrs. Gibbs:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Mr. Brendan Vieg
Butte Creek Watershed Conservancy
P.O. Box 1611
Chico, CA 95927-1611

Dear Mr. Vieg:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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GRAY DAVIS, Governor

May 8, 2000

Ms. Rebekah Baker McGuire
Central Sierra Watershed Coalition
P.O. Box 67
Angels Camp, CA 95222

Dear Ms. McGuire:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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(916) 653-8983

May 8, 2000

Ms. Linda Cole
Cherokee Watershed
7399 Highway 99
Oroville, CA 95965

Dear Ms. Cole:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Ms. Loretta Carrico
Cottonwood Creek Watershed Grp.
P.O. box 1198
Redding, CA 96002

Dear Ms. Carrico:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Ms. Diane Gaumer
Deer Creek Watershed Conservancy
P.O. Box 307
Vina, CA 96092

Dear Ms. Gaumer:

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GRAY DAVIS, Governor

May 8, 2000

Mr. Tim Weaver
Fall River RCD
P.O. Box 83
McArthur, CA 96065

Dear Mr. Weaver:

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Ms. Karen Kibble
Feather River CRMP
P.O. Box 3880
Quincy, CA 95971

Dear Ms. Kibble:

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Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Mr. Jim Wilcox
Feather River CRMP
P.O. Box 3880
Quincy, CA 95971

Dear Mr. Wilcox:

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GRAY DAVIS, *Governor*

ORIGINAL

May 8, 2000

Mr. Gary Nakamura
University of California, Coop. Ext.
1851 Hartnell Avenue
Redding, CA 96002

Dear Mr. Nakamura:

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(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Mr. Scott Murphy
Izaak Walton League
P.O. Box 3051
Chico, CA 95927

Dear Mr. Murphy:

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GRAY DAVIS, Governor

May 8, 2000

Mr. John Benoit
Glenn County Resource, Planning
125 S. Murdock Street
Willows, CA 95988

Dear Mr. Benoit:

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May 8, 2000

Ms. Linda Cole
7399 Highway 99
Oroville, CA 95965

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(916) 653-8983

ORIGINAL

May 8, 2000

Ms. Jean Hubbell
Little Chico Creek Watershed
P.O. Box 365
Forest Ranch, CA 95942

Dear Ms. Hubbell:

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(916) 653-8983

ORIGINAL

May 8, 2000

Ms. Mary Schroeder
Battle Creek, Clear Creek,
Middle Creek Watersheds
3294 Bechelli Lane
Redding, CA 96002

Dear Ms. Schroeder:

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Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Ms. Kerry Burke
Mill Creek Conservancy
P.O. Box 188
Los Molinos, CA 96055

Dear Ms. Burke:

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GRAY DAVIS, Governor

May 8, 2000

Mr. Burt Bundy, Sacto. River Coord.
Dept. of Water Resources
2440 Main Street
Red Bluff, CA 96080

Dear Mr. Bundy:

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ORIGINAL

May 8, 2000

Mr. John McCullah
Sacramento Watersheds Action Grp.
3141 Bechelli Lane
Redding, CA 96002

Dear Mr. McCullah:

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ORIGINAL

May 8, 2000

Mr. John Merz
Sacramento River Pres. Trust
P.O. Box 5366
Chico, CA 95927

Dear Mr. Merz:

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ORIGINAL

May 8, 2000

Mr. Radley Reep
San Joaquin River Committee
P.O. Box 14166
Fresno, CA 93650

Dear Mr. Reep:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

If you have any questions, I can be reached at (916) 653-8983 for additional information.

Sincerely,

Deborah C. McKee

Deborah C. McKee
Habitat Conservation Division
Native Anadromous Fish
and Watershed Branch
Threatened and Endangered Salmon
Recovery Coordinator

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Mr. Dave Koehler
San Joaquin River Parkwy. & Cons. Trust
1550 E. Shaw Avenue, Ste. 114
Fresno, CA 93710

Dear Mr. Koehler:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Ms. Sandy Flourney
Thomes Creek Watershed Association
P.O. Box 2365
Flourney, CA 96029

Dear Ms. Flourney:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

South Yuba River Citizens League
216 Main Street
Nevada city, CA 95959

Dear Gentlemen:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Yuba County Water Agency
1402 D Street
Marysville, CA 95901

Dear Gentlemen:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Mr. Richard Roth
Streamminders of Chico
1318 Bruce Street
Chico, CA 95926

Dear Mr. Roth:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Mr. Chuck DeJournette
Tehama Fly Fishers
P.O. Box 224
Red Bluff, CA 96080

Dear Mr. DeJournette

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Ms. Vicki Dawley
Tehama County Resources Conserv. District
2 Sutter Street, Suite D
Red Bluff, CA 96080

Dear Ms. Dawley:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

ORIGINAL

May 8, 2000

Mr. Vince Cloward
Upper Sacramento River Exchange
P.O. Box 784
Dunsmuir, CA 96025

Dear Mr. Cloward:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Mr. Val Connor
Sacramento River Watershed Program
3443 Routier Road, Suite A
Sacramento CA 95827-3003

Dear Mr. Connor:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814
(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Mr. Charles Kutz
Butte Creek Watershed Conservancy
P.O. Box 1611
Chico, CA 95927

Dear Mr. Kutz:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

May 8, 2000

Mr. Tom Last
Sutter County Planning Department
1160 Civic Center Blvd.
Yuba City, CA 95993

Dear Mr. Last:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

ORIGINAL

May 8, 2000

Mr. Tom Parilo, Develop. Services Director
Butte County Planning Commission
7 County Center Drive
Oroville, CA 95965

Dear Mr. Parilo:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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1416 Ninth Street
Sacramento, CA 95814

(916) 653-8983

GRAY DAVIS, Governor

May 8, 2000

Ms. Suzanne Gibbs
Big Chico Creek Watershed Alliance
1162 E. 7th Street
Chico, CA 95928-0003

Dear Ms. Gibbs:

As required by the CALFED Bay-Delta Program, this letter is to notify the Board of Supervisors that the California Department of Fish and Game will submit a proposal to the CALFED program for funding of a research project which will occur within Sacramento County. The research project consists of evaluating the genetic structure of chinook salmon populations within California's Central Valley. The goal is to improve our understanding of existing chinook salmon population structure and relatedness to further State and Federal restoration and recovery efforts for these species.

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Native Anadromous Fish
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Recovery Coordinator

ORIGINAL

Environmental Compliance Checklist

All applicant s must fill out this Environment al Compliance Checklist. Applications must contain answers to the following questions to be responsive and to be considered for funding. *Failure to answer these questions and include them with the application will result in the application being considered nonresponsive and not considered for funding.*

1. Do any of the actions included in the proposal require compliance with either the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), or both?

_____	X
YES	NO

2. If you answered yes to # 1, identify the lead governmental agency for CEQA/NEPA compliance.

_____
Lead Agency

3. If you answered no to # 1, explain why CEQA/ NEPA compliance is not required f or the actions in the proposal.

No state permit is required for the California Department of Fish and Game (Department) to collect and process tissue samples taken from carcasses of adult chinook salmon. Although the California Endangered Species Act (CESA) generally prohibits the take or possession of live or dead animals that are listed by the State as threatened or endangered (in this case, spring-run chinook salmon within the Central Valley) without a permit, State regulations expressly authorize California Department employees and agents to take and possess these animals for scientific purposes (Title 14 California Code of Regulations, Section 783.1(c)).

The Department believes this project falls within the Class 6 categorical CEQA exemption and that no CEQA environmental document will need to be prepared. Class 6 exempt activities consist of "basic data collection, research, experimental management and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. ...". This exemption is appropriate because the project will not result in mortality or injury to a living animal listed under CESA.

No Federal Endangered Species Act Section 10(a)1[A} Research Permit for scientific purposes is presently needed by the Department to collect the proposed chinook salmon tissue samples. The Department will not be performing tissue collections of federally-listed endangered Sacramento winter-run chinook salmon. Winter-run tissue samples will be obtained from the U.S. Fish and Wildlife Service who possess a Section 10(a)1[A} Research Permit from NMFS to perform collections and sampling of Sacramento winter-run chinook salmon as part of the Winter-run Chinook Salmon Broodstock Program. No Federal Endangered Species Act Section 10(a)1[A} Research Permit for scientific purposes is presently needed by the Department to collect Central Valley spring- or fall-/late fall-run chinook salmon tissues from carcasses since NMFS has not yet promulgated a 4(d) Rule prohibiting take of Central Valley chinook salmon.

If the Department receives federal funding through CALFED, the Department believes this project qualifies for a categorical exclusion under NEPA because it is environmentally benign in the short term and should over time produce data that can be used to benefit fish species. The project qualifies as "...research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality or habitat destruction..." (Department of Interior Manual, Part 516, Chapter 6, Section 1.4 B (1)).

ORIGINAL

4. If CEQA/NEPA compliance is required, describe how the project will comply with either or both of these laws. Describe where the project is in the compliance process and the expected date of completion.

   If, during the execution of the proposed three-year study, a 4(d) Rule is promulgated for Central Valley spring-or fall-/late fall-run chinook salmon and permits for scientific research are necessitated, the Department will request NMFS amend the Department's existing Section 10(a)1[A} Research Permit which presently authorizes specific levels of take for Sacramento winter-run chinook salmon. In such a case, NMFS would be the NEPA Lead Agency for authorizing take for scientific purposes.

5. Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?

   X
   YES

   _____
   NO

   In order to perform field collections, access will be across public lands for the following streams: American Cosumnes, Feather, Mokelumne, and Upper Sacramento rivers, Clear, Butte Big Chico, and Battle creeks. Permission for access across private land has been obtained for Mill and Deer creeks (letters attached). Access points for Cottonwood, Beegum, and Antelope creeks need to be determined and documentation of permission will be provided to CALFED within 30 days of notification of approval.

ORIGINAL

6. Please indicate what permits or other approvals may be required for the activities contained in your proposal. Check all boxes that apply.

LOCAL

Conditional use permit	___
Variance	___
Subdivision Map Act approval	___
Grading permit	___
General plan amendment	___
Specific plan approval	___
Rezone	___
Williamson Act Contract cancellation	___
Other _____ (please specify)	
None required	X

STATE

CESA Compliance	___ (CDFG)
Streambed alteration permit	___ (CDFG)
CWA § 401 certification	___ (RWQCB)
Coastal development permit	___ (Coastal Commission/BCDC)
Reclamation Board approval	___
Notification	___ (DPC, BCDC)
Other _____ (please specify)	
None required	X

FEDERAL

ESA Consultation	___ (USFWS)
Rivers & Harbors Act permit	___ (ACOE)
CWA § 404 permit	___ (ACOE)
Other _____ (please specify)	
None required	X

DPC = Delta Protection Commission
CWA = Clean Water Act
CESA = California Endangered Species Act
USFWS = U.S. Fish and Wildlife Service
ACOE = U.S. Army Corps of Engineers

ESA = Endangered Species Act
CDFG = California Department of Fish and Game
RWQCB = Regional Water Quality Control Board
BCDC= Bay Conservation and Development Comm.

ORIGINAL

Land Use Checklist

All applicant s must fill out t his Land Use Checklist for t heir proposal. Applications must contain answers to the following questions to be responsive and to be considered for funding. *Failure to answer these questions and include them with the application will result in the application being considered nonresponsive and not considered for funding.*

1. Do the actions in the proposal involve physical changes to the land (i.e. grading, planting vegetation, or breeching levees) or restrictions in land use (i.e. conservation easement or placement of land in a wildlife refuge)?

   _____ YES X NO

2. If NO to # 1, explain what type of actions are involved in the proposal (i.e., research only, planning only). Research only to collect tissue samples from adult chinook salmon carcasses.

3. If YES to # 1, what is the proposed land use change or restriction under the proposal?

4. If YES to # 1, is the land currently under a Williamson Act contract?

   _____ YES _____ NO

5. If YES to # 1, answer the following:

   Current land use _____

   Current zoning _____

   Current general plan designation _____

6. If YES to #1, is the land classified as Prime Farmland, Farmland of Statewide Importance or Unique Farmland on the Department of Conservation Important Farmland Maps?

   _____ YES _____ NO _____ DON'T KNOW

7. If YES to # 1, how many acres of land will be subject to physical change or land use restrictions under the proposal?

   _____

8. If YES to # 1, is the property currently being commercially farmed or grazed?

   _____ YES _____ NO

9. If YES to #8, what are: the number of employees/acre_____
   the total number of employees_____

ORIGINAL

10. Will the applicant acquire any interest in land under the proposal (fee title or a conservation easement)?

_____ YES X NO

11. What entity/organization will hold the interest? _____

12. If YES to # 10, answer the following:

Total number of acres to be acquired under proposal _____
Number of acres to be acquired in fee _____
Number of acres to be subject to conservation easement _____

13. For all proposals involving physical changes to the land or restriction in land use, describe what entity or organization will:

Manage the property _____

Provide operations and maintenance services _____

Conduct monitoring _____

14. For land acquisitions (fee title or easements), will existing water rights also be acquired?

_____ YES _____ NO

15. Does the applicant propose any modifications to the water right or change in the delivery of the water?

_____ YES X NO

16. If YES to # 15, describe _____

ORIGINAL

Agreement No.:_____

Exhibit:_____

STANDARD CLAUSES –
INTERAGENCY AGREEMENTS

Audit Clause. For Agreements in excess of $10,000, the parties shall be subject to the examination and audit of the State Auditor for a period of three years after final payment under the Agreement. (Government Code Section 8546.7).

Availability of Funds. Work to be performed under this Agreement is subject to availability of funds through the State's normal budget process.

Interagency Payment Clause. For services provided under this Agreement, charges will be computed in accordance with State Administrative Manual Sections 8752 and 8752.1.

Termination Clause. Either State agency may terminate this Agreement upon thirty (30) days' advance written notice. The State agency providing the services shall be reimbursed for all reasonable expenses incurred up to the date of termination.

Severability. If any provision of this Agreement is held invalid or unenforceable by any court of final jurisdiction, it is the intent of the parties that all other provisions of this Agreement be construed to remain fully valid, enforceable, and binding on the parties.

Y2K Language. The Contractor warrants and represents that the goods or services sold, leased, or licensed to the State of California, its agencies, or its political subdivisions, pursuant to this Agreement are "Year 2000 compliant" For purposes of this Agreement, a good or service is Year 2000 compliant if it will continue to fully function before, at, and after the Year 2000 without interruption and, if applicable, with full ability to accurately and unambiguously process, display, compare, calculate, manipulate, and otherwise utilize date information. This warranty and representation supersedes all warranty disclaimers and limitations and all limitations on liability provided by or through the Contractor.

OMB Approval No. 0348-0043

APPLICATION FOR FEDERAL ASSISTANCE

ORIGINAL

2. DATE SUBMITTED: 05/12/00	Applicant Identifier:
3. DATE RECEIVED BY STATE:	State Application Identifier:
4. DATE RECEIVED BY FEDERAL AGENCY:	Federal Identifier:

1. TYPE OF SUBMISSION:

Application	*Preapplication*
☐ Construction	☐ Construction
☒ Non-Construction	☐ Non-Construction

5. APPLICANT INFORMATION

Legal Name: Deborah C. McKee

Organizational Unit: California Department of Fish and Game

Address (*give city, county, state, and zip code*):
1416 Ninth Street
Sacramento, California 95814

Name and telephone number of the person to be contacted on matters involving this application (*give area code*)
Deborah C. McKee
(916) 653-8983

6. EMPLOYER IDENTIFICATION NUMBER (EIN): 94 – 1697567

7. TYPE OF APPLICANT: (*enter appropriate letter in box*) A

A. State
B. County
C. Municipal
D. Township
E. Interstate
F. Intermunicipal
G. Special District
H. Independent School Dist.
I. State Controlled Institution of Higher Learning
J. Private University
K. Indian Tribe
L. Individual
M. Profit Organization
N. Other (Specify):

8. TYPE OF APPLICATION:

☒ New ☐ Continuation ☐ Revision

If Revision, enter appropriate letter(s) in box(es): ☐ ☐

A. Increase Award B. Decrease Award C. Increase Duration
D. Decrease Duration Other (*specify*):

9. NAME OF FEDERAL AGENCY:
Service Contract with National Marine Fisheries Service

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: . .

TITLE:

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:
Gentic Population Structure of Central Valley Chinook Salmon

12. AREAS AFFECTED BY PROJECT (*cities, counties, states, etc.*):
Central Valley

13. PROPOSED PROJECT:

Start Date	Ending Date
04/01	03/04

14. CONGRESSIONAL DISTRICTS OF:

a. Applicant	b. Project
5	Statewide

15. ESTIMATED FUNDING:

a. Federal	$	1,321,585.00
b. Applicant	$	0.00
c. State	$	316,940.00
d. Local	$	0.00
e. Other NMFS In-Kind Contribution	$	312,454.00
f. Program Income	$	0.00
g. TOTAL	$	1,950,979.00

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:
DATE

b NO. ☐ PROGRAM IS NOT COVERED BY E.O. 12372

☐ OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?

☐ Yes If "Yes," attach an explanation. ☒ No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED

a. Typed Name of Authorized Representative	b. Title	c. Telephone number
Deborah C. McKee/ Larry Week	Senior Biologist Specialist	916.653.8983

d. Signature of Authorized Representative
Deborah C. McKee

e. Date Signed
5-12-00

Previous Editions Not Usable

Standard Form 424 (REV 4-88)
Prescribed by OMB Circular A-102

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

General Instructions

This form is designed so that application can be made for funds from one or more grant programs. In preparing the budget, adhere to any existing Federal grantor agency guidelines which prescribe how and whether budgeted amounts should be separately shown for different functions or activities within the program. For some programs, grantor agencies may require budgets to be separately shown by function or activity. For other programs, grantor agencies may require a breakdown by function or activity. Sections A, B, C, and D should include budget estimates for the whole project except when applying for assistance which requires Federal authorization in annual or other funding period increments. In the latter case, Sections A, B, C, and D should provide the budget for the first budget period (usually a year) and Section E should present the need for Federal assistance in the subsequent budget periods. All applications should contain a breakdown by the object class categories shown in Lines a-k of Section B.

Section A. Budget Summary Lines 1-4 Columns (a) and (b)

For applications pertaining to a *single* Federal grant program (Federal Domestic Assistance Catalog number) and *not requiring* a functional or activity breakdown, enter on Line 1 under Column (a) the Catalog program title and the Catalog number in Column (b).

For applications pertaining to a *single* program *requiring* budget amounts by multiple functions or activities, enter the name of each activity or function on each line in Column (a), and enter the Catalog number in Column (b). For applications pertaining to multiple programs where none of the programs require a breakdown by function or activity, enter the Catalog program title on each line in *Column* (a) and the respective Catalog number on each line in Column (b).

For applications pertaining to *multiple* programs where one or more programs *require* a breakdown by function or activity, prepare a separate sheet for each program requiring the breakdown. Additional sheets should be used when one form does not provide adequate space for all breakdown of data required. However, when more than one sheet is used, the first page should provide the summary totals by programs.

Lines 1-4, Columns (c) through (g)

For new applications, leave Column (c) and (d) blank. For each line entry in Columns (a) and (b), enter in Columns (e), (f), and (g) the appropriate amounts of funds needed to support the project for the first funding period (usually a year).

For continuing grant program applications, submit these forms before the end of each funding period as required by the grantor agency. Enter in Columns (c) and (d) the estimated amounts of funds which will remain unobligated at the end of the grant funding period only if the Federal grantor agency instructions provide for this. Otherwise, leave these columns blank. Enter in columns (e) and (f) the amounts of funds needed for the upcoming period. The amount(s) in Column (g) should be the sum of amounts in Columns (e) and (f).

For supplemental grants and changes to existing grants, do not use Columns (c) and (d). Enter in Column (e) the amount of the increase or decrease of Federal funds and enter in Column (f) the amount of the increase or decrease of non-Federal funds. In Column (g) enter the new total budgeted amount (Federal and non-Federal) which includes the total previous authorized budgeted amounts plus or minus, as appropriate, the amounts shown in Columns (e) and (f). The amount(s) in Column (g) should not equal the sum of amounts in Columns (e) and (f).

Line 5 - Show the totals for all columns used.

Section B Budget Categories

In the column headings (1) through (4), enter the titles of the same programs, functions, and activities shown on Lines 1-4, Column (a), Section A. When additional sheets are prepared for Section A, provide similar column headings on each sheet. For each program, function or activity, fill in the total requirements for funds (both Federal and non-Federal) by object class categories.

Line 6a-i - Show the totals of Lines 6a to 6h in each column.

Line 6j - Show the amount of indirect cost.

Line 6k - Enter the total of amounts on Lines 6i and 6j. For all applications for new grants and continuation grants the total amount in column (5), Line 6k, should be the same as the total amount shown in Section A, Column (g), Line 5. For supplemental grants and changes to grants, the total amount of the increase or decrease as shown in Columns (1)-(4), Line 6k should be the same as the sum of the amounts in Section A, Columns (e) and (f) on Line 5.

Line 7 - Enter the estimated amount of income, if any, expected to be generated from this project. Do not add or subtract this amount from the total project amount, Show under the program

narrative statement the nature and source of income. The estimated amount of program income may be considered by the Federal grantor agency in determining the total amount of the grant.

Section C. Non-Federal Resources

Lines 8-11 Enter amounts of non-Federal resources that will be used on the grant. If in-kind contributions are included, provide a brief explanation on a separate sheet.

Column (a) - Enter the program titles identical to Column (a), Section A. A breakdown by function or activity is not necessary.

Column (b) - Enter the contribution to be made by the applicant.

Column (c) - Enter the amount of the State's cash and in-kind contribution if the applicant is not a State or State agency. Applicants which are a State or State agencies should leave this column blank.

Column (d) - Enter the amount of cash and in-kind contributions to be made from all other sources.

Column (e) - Enter totals of Columns (b), (c), and (d).

Line 12 - Enter the total for each of Columns (b)-(e). The amount in Column (e) should be equal to the amount on Line 5, Column (f), Section A.

Section D. Forecasted Cash Needs

Line 13 - Enter the amount of cash needed by quarter from the grantor agency during the first year.

Line 14 - Enter the amount of cash from all other sources needed by quarter during the first year.

Line 15 - Enter the totals of amounts on Lines 13 and 14.

Section E. Budget Estimates of Federal Funds Needed fo Balance of the Project

Lines 16-19 - Enter in Column (a) the same grant program title shown in Column (a), Section A. A breakdown by function c activity is not necessary. For new applications and continuatio grant applications, enter in the proper columns amounts of Federa funds which will be needed to complete the program or project ove the succeeding funding periods (usually in years). This sectio need not be completed for revisions (amendments, changes, c supplements) to funds for the current year of existing grants.

If more than four lines are needed to list the program titles, subm additional schedules as necessary.

Line 20 - Enter the total for each of the Columns (b)-(e). Whe additional schedules are prepared for this Section, annotat accordingly and show the overall totals on this line.

Section F. Other Budget Information

Line 21 - Use this space to explain amounts for individual direc object class cost categories that may appear to be out of th ordinary or to explain the details as required by the Federal grantc agency.

Line 22 - Enter the type of indirect rate (provisional, predetermine final or fixed) that will be in effect during the funding period, th estimated amount of the base to which the rate is applied, and th total indirect expense.

Line 23 - Provide any other explanations or comments deeme necessary.

BUDGET INFORMATION - Non-Construction Programs

OMB Approval No. 0348-0044

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Year 1		$	$	$ 544,892	$	$ 544,892
2. Year 2				445,075		445,075
3. Year 3				331,618		331,618
4.						
5. Totals		$	$	$ 1,321,585	$	$ 1,321,585

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total
	(1) Program	(2)	(3)	(4)	(5)
a. Personnel	$ 465,255	$	$	$	$
b. Fringe Benefits	38,603				
c. Travel	28,800				
d. Equipment	35,000				
e. Supplies	85,790				
f. Contractual	474,062				
g. Construction					
h. Other					
i. Total Direct Charges *(sum of 6a-6h)*	1,126,460				
j. Indirect Charges (Overhead)	209,040				
k. TOTALS *(sum of 6i and 6j)*	$ 1,321,585	$	$	$	$
7. Program Income	$ 0.0	$	$	$	$

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Standard Form 424A (Rev. 7-97)
Prescribed by OMB Circular A-102

Previous Edition Usable

SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS
8. CDFG - In-kind Services	$	$ 316,940	$	$ 316,940
9.				
10.				
11.				
12. TOTAL *(sum of lines 8-11)*	$	$	$	$ 316,940

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 544,892	$ 136,223	$ 136,223	$ 136,223	$ 136,223
14. Non-Federal					
15. TOTAL *(sum of lines 13 and 14)*	$ 544,892	$	$	$	$

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (Years)			
	(b) First	(c) Second	(d) Third	(e) Fourth
16. CALFED	$ 544,892	$ 445,075	$ 331,618	$
17.				
18.				
19.				
20. TOTAL *(sum of lines 16-19)*	$ 544,892	$ 445,075	$ 331,618	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: 1,126,460	22. Indirect Charges: 209,040
23. Remarks:	

ASSURANCES - NON-CONSTRUCTION PROGRAMS

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

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9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE
[signature]	Senior Biologist (Marine/Fisheries)
APPLICANT ORGANIZATION	DATE SUBMITTED
California Department of Fish and Game	5-12-00

U.S. Department of the Interior

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Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying

Persons signing this form should refer to the regulations referenced below for complete instructions:

Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions - **The prospective primary participant further agrees by submitting this proposal that it will include the clause titled, "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.** See below for language to be used; use this form for certification and sign; or use Department of the Interior Form 1954 (DI-1954). (See Appendix A of Subpart D of 43 CFR Part 12.)

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions - (See Appendix B of Subpart D of 43 CFR Part 12.)

Certification Regarding Drug-Free Workplace Requirements - Alternate I. (Grantees Other Than Individuals) and Alternate II. (Grantees Who are Individuals) - (See Appendix C of Subpart D of 43 CFR Part 12.)

Signature on this form provides for compliance with certification requirements under 43 CFR Parts 12 and 18. The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of the Interior determines to award the covered transaction, grant, cooperative agreement or loan.

PART A: Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions

CHECK __ IF THIS CERTIFICATION IS FOR A PRIMARY COVERED TRANSACTION AND IS APPLICABLE.

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

PART B: Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

CHECK __ IF THIS CERTIFICATION IS FOR A LOWER TIER COVERED TRANSACTION AND IS APPLICABLE.

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

DI-2010
March 1995
(This form consolidates DI-1953, DI-1954, DI-1955, DI-1956 and DI-1963)

PART C: Certification Regarding Drug-Free Workplace Requirements

CHECK __ IF THIS CERTIFICATION IS FOR AN APPLICANT WHO IS NOT AN INDIVIDUAL.

Alternate I. (Grantees Other Than Individuals)

A. The grantee certifies that it will or continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about--
(1) The dangers of drug abuse in the workplace;
(2) The grantee's policy of maintaining a drug-free workplace;
(3) Any available drug counseling, rehabilitation, and employee assistance programs; and
(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will --
(1) Abide by the terms of the statement; and
(2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(e) Notifying the agency in writing, within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted --
(1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

B. The grantee may insert in the space provided below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance (Street address, city, county, state, zip code)

_____

_____

_____

Check __ if there are workplaces on file that are not identified here.

PART D: Certification Regarding Drug-Free Workplace Requirements

CHECK __ IF THIS CERTIFICATION IS FOR AN APPLICANT WHO IS AN INDIVIDUAL.

Alternate II. (Grantees Who Are Individuals)

(a) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant;

(b) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing, within 10 calendar days of the conviction, to the grant officer or other designee, unless the Federal agency designates a central point for the receipt of such notices. When notice is made to such a central point, it shall include the identification number(s) of each affected grant.

DI-2010
March 1995
(This form consolidates DI-1953, DI-1954, DI-1955. DI-1956 and DI-1963)

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PART E: Certification Regarding Lobbying
Certification for Contracts, Grants, Loans, and Cooperative Agreements

CHECK ✓ IF CERTIFICATION IS FOR THE AWARD OF ANY OF THE FOLLOWING AND THE AMOUNT EXCEEDS $100,000: A FEDERAL GRANT OR COOPERATIVE AGREEMENT, SUBCONTRACT, OR SUBGRANT UNDER THE GRANT OR COOPERATIVE AGREEMENT.

CHECK __ IF CERTIFICATION IS FOR THE AWARD OF A FEDERAL LOAN EXCEEDING THE AMOUNT OF $150,000, OR A SUBGRANT OR SUBCONTRACT EXCEEDING $100,000, UNDER THE LOAN.

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

As the authorized certifying official, I hereby certify that the above specified certifications are true.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL Deborah C. McKee

TYPED NAME AND TITLE Deborah C. McKee, Senior Biologist Spec. (Marine/Fisher

DATE 5-12-00

DI-2010

March 1995

(This form consolidates DI-1953, DI-1954, DI-1955, DI-1956 and DI-1963)

ORIGINAL

TRESPASS PERMISSION

Date: February 10, 1994

Creek: Mill Creek
County: Tehama
Landowner: Richard M. & Hazel V. Krone Phone #: (916) 384-2627

Permission to trespass onto property on Mill Creek,
Parcel Number(s): 078-090-41-1
078-090-42-1
078-060-~~18~~76-1

☑ Granted

☐ Denied (Reason please)

Comments:

Richard Krone

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080

IFD-RED BLUFF

2/14/94

ORIGINAL

TRESPASS PERMISSION

Date: February 10, 1994

Creek: Mill Creek
County: Tehama
Landowner: Mark Steven & Katherine Sue Klinesteker Phone #: 384-1127

Permission to trespass onto property on Mill Creek,
Parcel Number(s): 078-360-21-1
078-360-18-1

☒ Granted Mark Kl 2/11/94

☐ Denied (Reason please)

Comments:

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080

ORIGINAL

TRESPASS PERMISSION

Date: February 10, 1994

Creek: Mill Creek
County: Tehama
Landowner: Jennifer Hanna Horsman ETAL
% Jubb R. Hanna
R. Judd Hanna

Phone #: 916 595-4493

Permission to trespass onto property on Mill Creek,
Parcel Number(s): 015-080-28-1
015-080-38-1
015-080-39-1

☒ Granted

☐ Denied (Reason please)

Comments: Please Contact me AT The Above number before you schedule your walk. I would enjoy walking along + learning. Also, I will contact you if + when we see the salmon - We have seen salmon as early as July and most often in October.

Thank you R. Judd Hanna

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080

2/10/94

ORIGINAL

TRESPASS PERMISSION

Date: February 8, 1994

Creek: Deer Creek
County: Tehama
Landowner: Abbey of New Clairveaux

Phone #: 839-2161

Permission to trespass onto property on Deer Creek,
Parcel Number(s): 079-190-13-1
079-190-15-1

☑ Granted

☐ Denied (Reason please)

Comments: Granted by Br. Paul Bernard, Manager.

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080

2/11/94

ORIGINAL

TRESPASS PERMISSION

Date: February 8, 1994

Creek: Deer Creek
County: Tehama
Landowner: Mr. & Mrs. Robert E. Ramsey, Jr. Phone #(916) 839-2251

Permission to trespass onto property on Deer Creek,
Parcel Number(s): 081-030-08-1
079-150-01-1

☑ Granted

☐ Denied (Reason please)

Comments:

We miss eating a few fresh trout.

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080

2/11/94

ORIGINAL

TRESPASS PERMISSION

Date: February 8, 1994

Creek: Deer Creek
County: Tehama
Landowner: Mr. Warren D. Rose ETAL Phone #: (916) 852-4269

Permission to trespass onto property on Deer Creek,
Parcel Number(s): 081-030-03-1
081-030-06-1
081-030-11-1

[X] Granted Warren D. Rose

[ ] Denied (Reason please)

Comments:

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080

ORIGINAL

TRESPASS PERMISSION

Date: February 8, 1994

Creek: Deer Creek
County: Tehama
Landowner: Diamond Lands Corporation

Phone #: 916-873-0530
916-365-3721

Permission to trespass onto property on Deer Creek,
Parcel Number(s): 053-110-11-1
053-120-05-1

☒ Granted

☐ Denied (Reason please)

Comments:

Mail to: Attn Colleen Harvey
California Department of Fish and Game
P.O. Box 578
Red Bluff CA 96080